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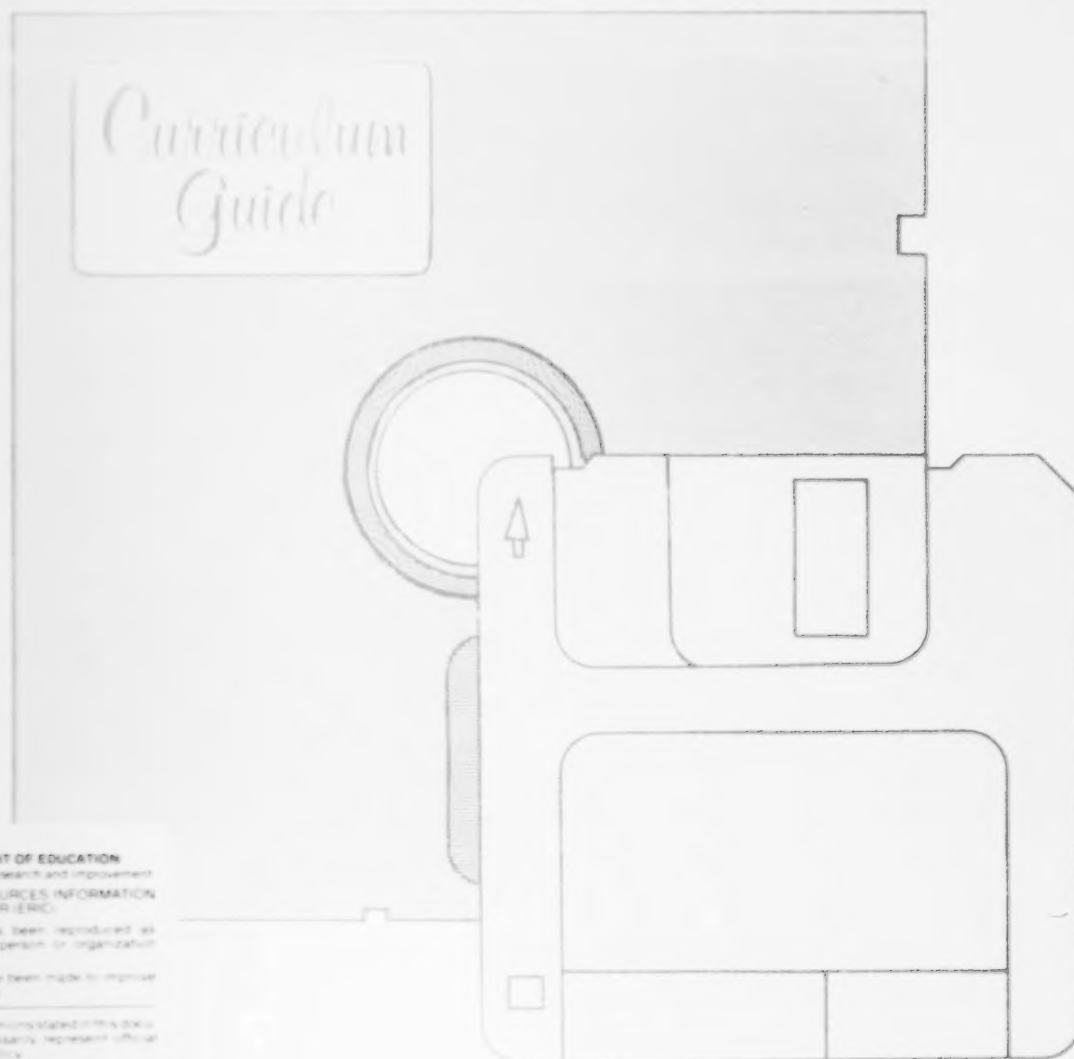
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ABSTRACT

This guide contains instructional materials for a course designed to provide students with a business computer applications background and skills that will not only prepare them for an entry-level position, but that will transfer through articulation to community colleges and later to four-year colleges. Introductory pages of the curriculum guide list procedures for use; a suggested scope and sequence; and essential elements for this guide (concepts and skills). Each of the six sections contains the essential elements, suggested unit lesson plans, answer sheets, and terminology for the units within the section. Each of the 12 units contain both unit and specific objectives, unit overview, lesson plan, activities and competency tests with answers, terminology, competency checklists--correlated with the specific elements of the course, and lists of print and audiovisual resources. Units cover data processing, information processing, electronic spreadsheets, information management, business application software, and social implications. Appendixes include references and resources addresses, course descriptions, essential elements, suggested equipment list, modification for special needs students, Texas articulation guidelines, Bloom's Taxonomy, and additional handouts, activities, and tests. (KC)

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BUSINESS COMPUTER APPLICATIONS I

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BUSINESS COMPUTER APPLICATIONS I

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PREFACE

The Office Education Business Computer Applications Curriculum was prepared to provide quality instructional materials for Office Education courses in Texas. The Occupational Curriculum Laboratory is currently developing and disseminating competency-based materials under contract with the Texas Education Agency for both secondary and postsecondary programs. All publications and instructional materials are developed and coordinated by curriculum specialists who are experienced instructors and are validated for technical content by business and industry.

Curriculum guides in this series are designed for five occupationally specific courses and one cluster course: Business Information Processing, Business Computer Applications I and II, Business Computer Programming I and II, and Microcomputing Applications. These guides serve as an excellent basis for achieving the Office Education essential elements mandated by the Texas Education Agency. The purpose of developing these curriculum guides is to provide the instructors with a comprehensive curriculum guide that furnishes an outline correlated to the essential elements, that is scoped and sequenced, and which furnishes a structure from which to prepare lesson plans. A competency checklist is provided for recording student's mastery or non-mastery of the essential elements. Suggestions and comments concerning these curriculum guides are requested.

INTRODUCTION

This guide is one of the curriculum guides developed for office education programs in Texas. The guides are formatted in sections and then broken down into units of instruction to assist in the mastery of the program by experienced teachers across the state. The guides were written in such a manner that uniformity in classroom instruction and program accountability across the state may be verified.

The instructional method used will depend upon class size, student abilities, and equipment. Each unit addresses the cognitive, affective, and psychomotor domains. Because each student learns differently and because each program should meet the needs of its local population, this guide was developed with flexibility, allowing the instructor to teach basic skills in a variety of methods. Modifications for special needs students is included in the appendix. Each instructor is encouraged to modify, add, or delete information as necessary to meet the individual needs of each student and the needs of the local program.

The Business Computer Applications I occupationally specific course is an office education program for students in grades 11-12. It may be a 175, 350, or 525 hour (1, 2, or 3 credit) total program. The intent of the program is to provide students with a business computer applications background and skills which will not only prepare them for an entry level position, but which, upon successful completion, will transfer through the 2+2+2 articulation program to community colleges participating within the state of Texas and later to four year participating colleges and universities.

This curriculum guide is intended to help instructors and administrators of the Business Computer Applications I occupationally specific course. Introductory pages of the curriculum guide list procedures for utilization; essential elements for this guide; a suggested scope and sequence; and suggested resources--texts, resources, software, and audio visuals. Each section contains the essential elements, suggested unit lesson plans, answer sheets, and terminology for the units within the section. Each unit contains both unit and specific objectives, generalization, unit overview, activities, competency tests, and competency checklists. Appendices appear at the end of this publication which include references and resources addresses, course descriptions, essential elements, suggested equipment list, modification for special needs students, 2+2+2 guidelines, Bloom's Taxonomy, and additional handouts.

The curriculum guide is divided into twelve units. The units are correlated with the essential elements for Business Computer Applications I. Although many of the activities suggested in these guides could be completed without the use of outside resources, it is suggested that the Office Education instructor utilize some of the resources listed in this curriculum guide in order to assist students in gaining realistic experience in office occupations.

It is suggested that the instructor wishing to use this curriculum guide first read the "Use of Instructional Materials" before beginning any instruction. The "Lesson Plans" contained in each unit of instruction include suggested teacher activities which should also be read carefully so that additional supplies and outside resources needed for completion of the unit can be secured. The instructor is encouraged to be creative in the use of the materials and information.

USE OF THE INSTRUCTIONAL UNITS

Each instructional section in the Office Education *Business Computer Applications I* curriculum guide is correlated to the essential elements. The basic components of the section pages include: essential element, lesson plans, answer sheets, and terminology. Each unit contains objectives for both the unit and the student, generalization, unit overview, activity sheets, competency tests, and proficiency checklists.

SECTION PAGES

Unit Lesson Plans

The unit lesson plans present the unit objective, student objective, focus, allocated time, domains, basic skills, content outline, suggested teacher activities and reteach activities, and specific teacher activities. Each unit lesson planned is designed to serve as a tool to facilitate the teacher in the preparation of daily lesson plans and to serve as a basic curriculum outline for each essential element.

Suggested teacher activities and reteach activities are provided. They are basic areas that need to be completed for each unit. Specific teacher activities provide information for the teacher so that adequate preparation may be made prior to starting the unit. Specific bulletin boards, types of guest speakers or field trips, and types of programs needed for specific student activities are included.

Answers

Answers are provided for all the activities and competency tests. Because of the diversified programs, and equipment in use across the state, some answers need to be provided by the teacher.

Terminology

Terminology lists and definitions are provided where appropriate. This may be pulled and duplicated for student use.

UNIT CONTENT

Objectives

The objective page states the goals of the program, thus providing a sense of direction and accomplishment for the student. Each unit of instruction is based on performance objectives. These performance objectives are stated in two forms: (1) unit objectives, which state the terminal performance expected of the student upon completion of the unit, and (2) student objectives which are those performances that will help the student to master the unit objective.

The objectives of the unit provide direction for the learning process. Therefore, it is important for teacher and students to discuss the objectives prior to covering the information in the unit. This discussion will provide a common understanding between teacher and student of the intent of the objectives. Performance terms have been used in all objectives of the units to assist in promoting the effectiveness among all individuals using the materials.

Instructors should feel free to delete or add objectives to tailor the material to the needs of the students

and the program. When objectives are added, corresponding information, activities, and evaluation should be designed and constructed.

In addition, a generalization is provided to guide the teacher in showing the students why they are studying this specific area and provides a focus.

Unit Overview

The Unit Overview is provided as a guide for teachers on what materials to cover that will specifically meet the essential element. It should be noted that the overview is not designed as a total source. The unit overview is an attempt to condense available current information in order to provide content essential for meeting cognitive (knowledge) objectives of the unit. The teacher will find that the unit overview serves as an excellent guide for presenting the background knowledge necessary to develop the skill specified in the unit objective. Information may be presented in several ways:

- (1) The instructor may use the information sheet as a guide for presenting the background knowledge necessary for students to complete the specific objectives and, ultimately, the unit objective, or;
- (2) Students may be allowed to read the unit overview sheets before or as information is discussed in class. Students should take notes on any additional information presented.

Activity Sheets

Learning activities are provided for each of the student objectives in the unit. They provide direction to study and also provide application and reinforcement of cognitive materials presented using the psychomotor and affective domains. An effort has been made to incorporate the following elements of the learning process: translation interpretation, application, analysis, synthesis, and evaluation so that the learning style of each student will be recognized.

The activity sheets may be given to the students for completion in class or may be used as homework assignments. Answer sheets are provided with the section information which may be used by the teacher and/or student in checking progress.

The instructor should preview the activities prior to making student assignments to assure that information has been covered and all supplies required are available. Specific suggestions have been made in the Unit Lesson Plan. Class time should be set aside for those that require group participation. Those activities that require student participation rather than written answers should be evaluated to the satisfaction of the instructor.

Competency Tests

Evaluation is most successful when objectives are clearly stated in advance of learning experience. The evaluation should be used to measure students' attainment of those specific objectives. Competency tests allow teachers to make a judgment about student progress in relation to a pre-determined standard. These standards should reflect those established by the business community for entry level employees. It is important that students understand the criteria that are used to evaluate their competency in a given subject area.

Written tests are provided for each unit. These tests are provided to measure the students' understanding of the information covered in the unit overview. Parts of the competency test are queued to the essential element and student objectives covered in the unit. Individual test items may be used as

a pre-test measure or as a review or oral quiz to assist the teacher in spotting difficulties being encountered by students in their efforts to accomplish the unit objective. The instructor should construct additional test items for any objectives and information added to the unit.

The evaluation instruments in this curriculum guide may be used in the following ways:

Individualized Instruction--After brief directions from the instructor, the student may complete the activities, and is then ready for the competency test. If the test results show a weakness in a specific area, the student should review that portion of the unit overview and retake the test.

Group Instruction--After participating in classroom discussion and completing the student activities, the student should be able to demonstrate mastery of items listed in the competency checklist in the curriculum guide. The competency test can be used to measure students' progress toward meeting these objectives.

Remedial and Reteach Instructions--Students who demonstrate a poor understanding of the subject matter may need remedial help. Competency tests in basic skills may be administered to diagnose the problem areas. For example, students in a computer programming class could take a competency test in this area to locate the deficiency. Once identified, remedial instructions could be initiated.

Competency Checklists

Competency Checklists are provided for each unit. The checklist was developed to assist the teacher in recording individual student progress toward the accomplishment of the unit competencies and in recording the mastery of each essential element. Space has been provided for additional reteach activities and other assignments. The checklists may be accumulated in a file and may serve as a portion of a competency profile. They may also be used as documentation for the student who is applying for 2+2+2 credit.

SUGGESTED SCOPE AND SEQUENCE

BUSINESS COMPUTER APPLICATIONS I

SECTION/UNIT	TITLE	WEEKS	HRS.
I.	DATA PROCESSING	5	25
1	Concepts of Data Processing	2	10
2	Data Entry Procedures	3	15
II.	INFORMATION PROCESSING	7	35
1	Concepts of Information Processing	2	10
2	Information Processing Applications	5	25
III.	ELECTRONIC SPREADSHEETS	7	35
1	Concepts of Electronic Spreadsheets	2	10
2	Electronic Spreadsheet Applications	5	25
IV.	INFORMATION MANAGEMENT	5	25
1	Concepts of Information Management	2	10
2	Information Management Applications	3	15
V.	BUSINESS APPLICATION SOFTWARE	3	15
1	Utility Programs	1	5
2	Productivity Programs	2	10
VI.	SOCIAL IMPLICATIONS	3	15
1	Effects on Society	2	10
2	Future Implications	1	5
TOTAL WEEKS/HOURS ALLOCATED:		30	150

One week has been set aside each six weeks for review, makeup work, and testing.

OFFICE EDUCATION ESSENTIAL ELEMENTS

BUSINESS COMPUTER APPLICATIONS I

75.87

- (e) Business Computer Applications I (one, two, or three units) shall include the following essential elements:
- (1) Concepts and skills related to general data processing. The student shall be provided opportunities to:
 - (A) demonstrate comprehension of data processing terms;
 - (B) identify the major components of data processing;
 - (C) identify and apply the functions of an operating system;
 - (D) demonstrate the ability to enter, manipulate, and retrieve data on a computer terminal; and
 - (E) understand concepts of networked and multi-user configurations.
 - (2) Concepts and skills related to information processing. The student shall be provided opportunities to:
 - (A) demonstrate basic information processing concepts; and
 - (B) apply general capabilities of information processing tools and software.
 - (3) Concepts and skills related to spreadsheets. The student shall be provided opportunities to:
 - (A) demonstrate basic spreadsheet concepts; and
 - (B) apply general capabilities of spreadsheets.
 - (4) Concepts and skills related to database management. The student shall be provided opportunities to:
 - (A) demonstrate basic database concepts, procedures, and capabilities; and
 - (B) apply general capabilities of database management.
 - (5) Concepts and skills related to business application software. The student shall be provided opportunities to demonstrate the ability to use automated business application concepts, principles, and practices in realistic situations.
 - (6) Concepts and skills related to computer operations. The student shall be provided opportunities to:
 - (A) observe and/or participate in computer activities in business and industry;

- (B) understand responsibilities and procedures involved in computer operations with individuals working in the field; and
- (C) identify emerging computer tools and understand their impact on business and industry.

SECTION I
DATA PROCESSING
ESSENTIAL ELEMENT
75.87 (e)(1)

Concepts and skills related to general data processing.

The student will be provided opportunities to:

- A. demonstrate comprehension of data processing terms;
- B. identify the major components of data processing;
- C. identify and apply the functions of an operating system;
- D. demonstrate the ability to enter, manipulate, and retrieve data on a computer terminal; and
- E. understand concepts of networked and multi-user configurations.

SUGGESTED UNIT LESSON PLAN

SECTION I: DATA PROCESSING

UNIT I: CONCEPTS OF DATA PROCESSING

ESSENTIAL 75.87
ELEMENT: (e)(1)(A)(B)(C)

ALLOCATED
TIME: 10 Hours

UNIT OBJECTIVE: Students will demonstrate an understanding of data processing concepts and terminology, exhibit familiarity with data processing components, and execute various data processing procedures.

STUDENT
OBJECTIVES:

After completing this unit, the student will be able to:

1. Identify the functions and terminology related to data processing
2. Identify and explain the relationship of the parts of the information processing cycle
3. Draw a time line of the historical events related to data processing
4. Compare the similarities and differences of the various sizes of computer systems
5. Specify and evaluate hardware components of the computer system
6. Compare and contrast various computer languages

FOCUS: A knowledge and understanding of the functions and terminology related to data processing, general computer history, computer components, operating systems, and languages are essential for an overall understanding of complex computer operations.

DOMAINS: Activities and competency tests have been designed to provide learning experiences utilizing the affective, cognitive, and/or psychomotor domains.

BASIC SKILLS: Activities and competency tests have been designed to reinforce the basic skills of reading, writing, and/or mathematics.

CONTENT OUTLINE

- I. Basic concepts of data processing
 - A. Data processing definition
 - B. Functions of data processing
 - C. Information processing cycle
- II. History and development of data processing
 - A. Inventions
 - B. Computer generations
- III. Types of computers
 - A. Supercomputers
 - B. Mainframe
 - C. Minicomputer
 - D. Microcomputer
- IV. Hardware components of a computer system
 - A. Central processing unit
 - B. Main memory
 - C. Secondary storage media
 - D. Types of access to stored data
- V. Computer languages
 - A. Categories of languages
 - B. Low-level computer languages
 - C. High-level languages
 - D. Criteria for selecting computer languages
- VI. Microcomputers
 - A. Types of microcomputer systems
 - B. Microcomputer system hardware components
 - C. Peripheral devices for storing data
 - D. Input/output devices
 - E. Internal hardware
 - F. Operating systems
 - G. Applications software
- VII. Mini and mainframe computer systems
 - A. Small business computer systems
 - B. Typical mainframe configurations

SUGGESTED TEACHER ACTIVITIES

General Teacher Preparations

1. Preview the unit and review objectives.
2. Decide on a variety of instructional methods to present the unit.
3. Prepare questioning techniques and closure statements.
4. Make modifications in curriculum for special needs students.
5. Consult several alternative sources to enhance and update your knowledge of the current trends, issues, and processes related to the unit content.
6. Select exercises, drills, and other resources to use as supplemental materials for the units.
7. Secure and prepare sufficient quantities of software backup diskettes for student use.
8. When appropriate, take a field trip or have a guest speaker present a portion of the unit describing industry standards.
9. Prepare appropriate bulletin boards and transparencies.
10. Make copies of appropriate handouts, activities, and test materials.
11. Secure overhead projector, LCD computer panel for data projection, and an appropriate screen.

General Classroom Preparations

1. Secure the students' attention.
2. Communicate learning expectations--goals to be accomplished.
3. Emphasize the value/importance of the unit content or activity.
4. Relate unit content to prior or future learning.
 - a. Use discussions and pretests to determine prior knowledge of the unit content.
 - b. From the results of the discussions and pretests, modify your teaching plans to fit student needs.
 - c. Use enthusiasm, and relate the content to the student's interests.

Reteach Activities

1. Use a new method to reteach a unit activity.
2. Using additional resources, create individualized materials for the more and less capable students.
3. Utilize those sections of tests which need additional reinforcement.
4. Utilize unit activities not previously used
5. Use peer practice for the reteaching of terminology--one student asks about the meaning of a word. The other student has the list of answers (words). Hints will be given until the word is matched with its correct definition.

Specific Teaching Activities

1. Prepare a flowchart illustrating the functions of data processing. Include an example of data at each phase of the process. Use the illustration in a class discussion on the functions of data processing.
 1. Collecting
 2. Recording
 3. Sorting
 4. Classifying
 5. Calculating
 6. Storing and retrieving
 7. Summarizing
 8. Communicating
2. Prepare a class time line illustrating the development of computers. The time line should include these events:

1.	Abacus	1000 BC
2.	Napier's Bones	1614
3.	Machine Arithmetique	1642
4.	Liebnitz Wheel	1672
5.	Jacquard's Loom	1804
6.	Herman Hollerith/IBM	1890
7.	Charles Babbage	1833
8.	Ada Lovelace	1835
9.	MARK I	1944
10.	ENIAC	1946
11.	EDSAC EDVAC	1947
12.	UNIVAC I	1951
3. Prepare a class bulletin board showing several historical examples of early computers. These could be found in old magazines and newspapers. With each example found, list information on the picture, including: the name of the computer, the manufacturer, its capabilities, the generation it belonged to, and how much it cost.
4. Collect pictures of several businesses or institutions and create a bulletin board matching those businesses to pictures of appropriate classes of computers: micro, mini, mainframe, or super.
5. Collect a series of magazine articles tracing the development of both the Apple and IBM lines of microcomputers. Have students read and report to the class.
6. Draw a chart illustrating the hardware elements of a computer and how they function together as a system.
7. Prepare a class chart or bulletin board illustrating the actions that will damage floppy disks. Discuss the following examples with the class:
 - Touching the disk inside the jacket
 - Bending the jacket
 - Writing on the jacket with a ballpoint pen or pencil
 - Exposure to dust

BCAI/Data Processing/Concepts of Data Processing/LESSON PLAN

Exposure to magnetic fields: radios, TV's etc.
Exposure to heat--leaving in car on a hot day

8. Make arrangements for students to visit a computer store, business, or school computer lab to see various types of hardware in operation. Most stores will have demonstration models set up of many different types of hardware including VGA color monitors, laser printers, and 386-based computers.
9. Have students prepare a bulletin board or notebook with pictures and data on the newest and best hardware available. This bulletin board should include examples of:

EGA and VGA monitors--including photos of on-screen displays
Laser printers--including examples of print quality
24-pin and 9-pin dot matrix printers--including examples of print quality
Ink-jet printers--including examples of print quality
Polaroid film recorders--including examples of slide quality
Color plotters--including examples of plot quality
386 computers--including charts comparing speed to XT systems.
Portable or laptop computer systems

For each example found, information should be posted including:

Name
Function
Manufacturer
Cost
Specification
Advantages over similar devices
Disadvantages compared to similar devices

10. The microcomputer industry is constantly changing. It is very important that the instructor keep abreast of changes so that new developments can be relayed to students. Since the time involved in publishing books puts them four to six months behind current developments, the best source of up-to-date information is popular computer magazines. Many examples can be found in bookstores and, if possible, class subscriptions should be obtained. Class exercises should be organized around available magazines.
11. Many advertisers will send brochures or even sample versions of their programs and products free of charge. Search through recent advertisements and mail the attached postcards or call for free information. These can be terrific class resources.

ANSWERS TO ACTIVITIES

Activity One

Project 1

```

APPLICATIONSOFTWARE
D      D      I      A
PASCAL ABACUS L      M
L              E      M
ROM      MAINFRAME M
V MAIN S      L M O
E A      C U L O U
L GRAPHICSPROGRAMS
A N      I E C Y E
C E O      R A C P
E T BUS      T A R
I I T      ENIAC O
MINICOMPUTER O H G
E P T U      N E R
N U A TRACKS T A
U T P      A M
      RESOLUTION B M
      L B E
HOLLERITHPUNCHEDCARD
D
    
```

Project 2

- | | | |
|---------------|-------------------|----------------|
| 1. functions | 10. intelligence | 19. clock |
| 2. cycle | 11. supercomputer | 20. bus |
| 3. abacus | 12. CPU | 21. primary |
| 4. loom | 13. random | 22. extension |
| 5. punched | 14. secondary | 23. Winchester |
| 6. engine | 15. operating | 24. mouse |
| 7. ENIAC | 16. translated | 25. resolution |
| 8. UNIVAC | 17. assembly | 26. laser |
| 9. integrated | 18. Pascal | 27. databases |

Activity Two

- | | |
|----------------------|--|
| 1. Summarizing-- | condensing data and information |
| 2. Calculating-- | performing mathematical operations |
| 3. Data collecting-- | collecting raw data that need to be processed |
| 4. Sorting-- | putting data in order, either alphabetically, or numerically |
| 5. Communicating-- | transferring data from one place to another. |
| 6. Recording-- | putting data into some form that is recognizable by person or machine. |

BCAI/Data Processing/Concepts of Data Processing/ANSWERS

- | | | |
|----|-----------------------------|---|
| 7. | Storing and--
Retrieving | storing data on some type of media for future use |
| 8. | Classifying-- | Arranging data according to some logical relationship |

Activity Three

Answers will vary slightly according to the text that is used.

Activity Four

Project 1

- | | | | | | |
|----|---|----|---|-----|---|
| 1. | F | 5. | H | 9. | J |
| 2. | I | 6. | A | 10. | E |
| 3. | K | 7. | B | 11. | D |
| 4. | C | 8. | L | 12. | G |

Project 2

Evaluated to the satisfaction of the instructor.

Activity Five

Project 1

- | | |
|---------------|--|
| Supercomputer | Very large computers with fast processing speeds that can access billions of characters of data and are used for applications such as physics, meteorology, and petroleum engineering |
| Mainframe | Used for complicated operations and can support large networks of users. Used by banks, large commercial and industrial companies and government agencies. |
| Minicomputer | Used when a desktop computer is not powerful enough to do the job. Can be relocated conveniently, no special power or environmental control requirements. Smaller, slower, and less expensive than mainframes, but perform the same tasks as mainframes only on a reduced scale. |
| Microcomputer | The smallest computers and largely owned by individuals. The name comes from the fact that its main computing component is located on one integrated circuit or chip. Microcomputers are the slowest computer but the least expensive. They are limited in the volume of data they can process, but they fit on a desk or table. The microcomputer does not require a data processing expert to operate it and supports many peripheral devices. |

NOTE: (ANSWERS MAY VARY ACCORDING TO LECTURE AND TEXTBOOK USED.)

Project 2

- | | | | |
|----|-----|-----|-----|
| 1. | D,C | 6. | A |
| 2. | D | 7. | B |
| 3. | D,C | 8. | D,C |
| 4. | D | 9. | D |
| 5. | C | 10. | D |

Projects 3-4 Evaluated to the satisfaction of the instructor.

Activity Six Evaluated to the satisfaction of the instructor. **NOTE:** This will also count in the competency test.

Activity Seven

Project 1

1. Level--Low-level languages are those which require the programmer to have detailed knowledge of the computer hardware system. A high-level language is a computer language that uses English-like commands. It is much easier to work with than machine language. These do not require the programmer to have working knowledge of the computer's internal components.

Purpose--If a language can be used to solve a variety of problems, it is considered to be general purpose. If the problems to be solved are specific, they are considered special purpose languages.

Structure--If it is relatively easy to implement the structure mechanisms and the language is considered to be structured.

Orientation--When programmers indicate the procedures or algorithms in solving a problem, they use a procedure-oriented language. A programmer can specify what is to be accomplished in a problem-oriented language, leaving the development of procedures to the language.

Translation--Every language, except for machine language, must be translated into zeros and ones. This function is performed by a computer program called a language translator. The language translator uses the program prepared by the programmer as input and produces the machine language as output.

Interaction--This means the programmer can conduct a dialogue with the computer; enter a line of code, have the computer test it, do an arithmetic computation, etc., in any order and at any time.

2. Orientation--When programmers indicate the procedures or algorithms in solving a problem, they use a procedure-oriented language. A programmer can specify what is to be accomplished in a problem-oriented language, leaving the development of procedures to the language.

BCAI/Data Processing/Concepts of Data Processing/ANSWERS

3. COBOL, PASCAL, PL/1, C
4. PL/1
5. PASCAL, C
6. COBOL
7. FORTRAN
8. BASIC
9. APL
10. ADA
11. FORTH

COMPETENCY TEST ANSWERS

Part 1 Project 1

- | | | |
|---------------------|-----------------------------|--------------------------|
| 1. backup copies | 18. peripherals | 35. fifth |
| 2. modem | 19. processor/CPU | 36. read/write window |
| 3. processing | 20. auxiliary | 37. MacIntosh |
| 4. second | 21. clock | |
| 5. operating system | 22. microcomputers | 38. Intel80386/80383/386 |
| 6. byte | 23. Cray | 39. Bus |
| 7. recording | 24. register microprocessor | 40. Primary Memory |
| 8. random/direct | 25. ROM | 41. RAM/Random Mem. |
| 9. auxiliary | 26. floppy | 42. Bernoulli Box |
| 10. hardware | 27. hard disks | 43. 12 |
| 11. K/Kilobyte | 28. mouse | 44. Winchester |
| 12. programmer | 29. XT | 45. Laser or Ink jet |
| 13. Translator | 30. resolution | 46. Hard-card |
| 14. sequential | 31. MS-DOS | 47. VGA |
| 15. commands | 32. Math coprocessor | 48. PS/2 |
| 16. third | 33. first | 49. Spreadsheets |
| 17. fourth | 34. information age | 50. System Approach |

Project 2 Evaluated to the satisfaction of the instructor.

Part 2 Described to the satisfaction of the instructor.

- Part 3**
- | | |
|------|-------|
| 1. C | 6. D |
| 2. A | 7. B |
| 3. B | 8. B |
| 4. B | 9. D |
| 5. A | 10. A |
11. Evaluated to the satisfaction of the instructor.

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Part 4

Supercomputer

Very large computers with fast processing speeds that can access billions of characters of data and are used for applications such as physics, meteorology, and petroleum engineering.

Mainframe

Used for complicated operations, and can support large networks of users. Used by banks, large commercial and industrial companies, and government agencies.

Minicomputer

Used when a desktop computer is not powerful enough to do the job. Can be relocated conveniently, no special power or environmental control requirements. Smaller, slower, and less expensive than mainframes, but perform the same tasks as mainframes only on a reduced scale.

Microcomputer

Are the smallest computers and largely owned by individuals. The name comes from the fact that its main computing component is located on one integrated circuit or chip. Microcomputers are the slowest computer but the least expensive. They are limited in the volume of data they can process, but they fit on a desk or table. The microcomputer does not require a data processing expert to operate it and supports many peripheral devices.

NOTE: (ANSWERS MAY VARY ACCORDING TO LECTURE AND TEXTBOOK USED.)

Part 5

Evaluated to the satisfaction of the instructor.

Part 6

- | | | | |
|----|---|----|---|
| 1. | C | 6. | D |
| 2. | G | 7. | B |
| 3. | E | 8. | H |
| 4. | F | 9. | I |
| 5. | A | | |

TERMINOLOGY

Abacus	The first counting machine, used over 3,000 years ago by the Chinese. Made up of four rods and beads.
Ada Lovelace	A mathematician and is recognized as the first programmer.
ADA	Multipurpose language developed by the U.S. Department of Defense due to their needs for a standardized language. Named to honor Ada Lovelace. Most recent and sophisticated of procedure-oriented languages.
Analog	Computers which measure continuously and are designed to translate physical conditions such as temperatures, pressure, and voltage in large quantities. Used mainly by scientists and engineers.
Analytical engine	In 1833, Charles Babbage, known as the father of computers, designed a machine that is very similar to the concepts used in today's computers. The machine was never built because Babbage was way ahead of technology, but he did leave many details for later inventors to use. If he had been successful, his machine would have been the first computer.
APPLE DOS 3.3	An operating system for Apple computers. It is usually stored on a floppy disk and allows 160K of disk storage.
Apple PRODOS 1.1	Professional Disk Operating System--ProDOS is faster, easier to use, and more powerful than DOS 3.3, the old disk operating system. It allows access to hard disks.
Application software	Application software is written by professional programmers, then packaged and sold for use by persons less experienced. Application software is used primarily on microcomputers. There are packages available for almost any application.
Applications software	Prepackaged software that is usually bought for operating microcomputers.
Arithmetic logic unit	Allows comparisons to be made in order to make logical decisions.
ASCII	American Standard Code for Information Interchange. ASCII is the most commonly used coding scheme today. It has a maximum character set of 128 codes; 0 through 127. Used mostly with microcomputers.
Assembly language	Developed in the early 1950s to make using machine language easier. Replaced the binary code with symbolic names that were easier to remember.
Auxiliary storage	Storage outside of the main storage area. Auxiliary storage is needed in all types of computer systems. It expands memory capacity and allows access to data.

BCAI/Data Processing/Concepts of Data Processing/TERMINOLOGY

Backup copies	Copies made of programs and data in case the original is damaged or destroyed.
BASIC	Beginner's All-Purpose Symbolic Instruction Code. A general purpose language for beginners which is the primary language for microcomputers.
Batch processing	The accumulation and processing of data as a group. Payrolls for large companies are usually completed through batch processing.
BCD	Binary Coded Decimal. This was designed to encode numeric information in a manner that would be easier than straight binary to convert into decimal. Each decimal digit in a decimal value is translated into its binary equivalent and is recorded in BCD position which contains four bits.
Bernoulli boxes	Storage devices located externally to the computer that store data on either 10Mb or 20Mb removable cartridges, allowing virtually unlimited storage.
Bubble memory	Contains small magnetic bubbles on thin single-crystal film of synthetic garnet. The presence or absence of a bubble is "on" or "off." Storage potential is very great.
Bus	If the CPU is the brain of the computer, the bus is the nervous system. The bus connects the CPU to itself and to the other components of the system. Communication can only take place one message at a time. The width of the bus is the number of bits that it can carry at once.
C	After concluding that system programming was too time consuming and difficult, AT&T developed a general, low-level language that would work on all computers. Many commercial application program operating systems for all sizes of computers are now prepared using the C language. C has also been used to develop special effects in many films.
Calculating	Performing mathematical operations.
Central processing unit	A microchip which handles most of the processing in the computer. It is divided into two parts-- the ALU and the control unit.
Character	A single letter, number, special symbol.
Classifying	Arranging data according to some logical relationship.
Clock	The clock is a crystal that vibrates at a high frequency. All operations within the CPU are synchronized to these regular vibrations.

BCAI/Data Processing/Concepts of Data Processing/TERMINOLOGY

COBOL	Common Business Oriented Language. Developed in 1960 to be used in business applications. It is a very popular procedure-oriented language. Used heavily in commercial and government computer installations. Dr. Grace Hopper, of the U.S. Navy, was a strong force behind the development of COBOL.
Communicating	Transferring data from one place to another.
Communications programs	These programs allow for communication between computers over phone lines.
Compiler	A program that interprets computer statements written in a symbolic form and converts the statements to machine language instructions.
Computer languages	The sequence of steps to be performed on the computer must be translated into detailed instructions the computer understands. Therefore, the programs must be written in a machine language understood by the computer.
Control unit	Controls all operations of the processor.
CPU	(Central Processor Unit)--Can be thought of as the brain of the computer. Traditionally, it is one processor, doing one job at a time, in one computer.
Data collecting	Collecting raw data that need to be processed.
Data communications	Transmission of data from one computer to another.
Data processing	The handling or manipulating of information in order to achieve a desired result.
Data structure	The arrangement of data for storing.
Databases	Programs designed to organize and sort lists of information.
Detail file	A file that contains a record of day-to-day transactions.
Digital	A computer that works by numbers and follows a set of instructions. Example--the type of computers used in the classroom are digital.
Direct access	Data can be stored and retrieved in any order. Also known as random access.
EBCDIC	Extended Binary Coded Decimal Interchange Code. It is an eight-bit code that accommodates as many as 256 different characters. Usually the standard coding scheme for mini and mainframe computers.
EDSAC and EDVAC	First electronic computers to utilize the stored program concept in the late 1940s.

BCAI/Data Processing/Concepts of Data Processing/TERMINOLOGY

ENIAC	Considered to be the first electronic computer and was developed by Dr. John W. Mauchly and J. Presper Ecker under a contract from the U.S. Army. This machine contained thousands and thousands of vacuum tubes and was completed in 1946.
Field	One piece of information such as a name, address, or date.
File	A group of related records treated as a unit.
File Allocation Table	(FAT) contains information that identifies each sector as part of a file or an empty sector.
File Structure	Data on disks are organized into <i>files</i> . A particular file may contain either program or data and must have a <i>file name</i> of up to eight characters and a period followed by a <i>file extension</i> of three letters. (example DOCUMENT.DOC, MS-word.HLP, Autoexec.bat)
Floppy disks	A floppy disk is a piece of mylar plastic that has been coated with a surface that can record magnetic images. The disk is housed inside a protective jacket and turns inside the jacket.
FORTH	Designed as a fourth generation computer language. It is a fairly low-level language which was developed for microcomputers in the 1970s. The name FORTH was derived from FOURTH because file names were limited to five characters on the computer used to develop this language.
FORTRAN	Formula Translator. Used primarily for solving scientific, engineering, and mathematical problems. Developed about 1956. It is the world's oldest high-level language.
Graphics programs	Paint, drawing, and desktop publishing programs. These programs are designed specifically for the graphic representations of data.
Hard cards	Are devices which allow 20 to 40 Mb of storage to be placed on an expansion port and used as an extra disk drive. They cost a little more than a regular hard disk but do not require an open disk drive slot in the front of the computer.
Hardware	Everything you can touch; just what the name implies, the physical parts associated with the computer.
Hollerith punched card	A technique invented by Herman Hollerith to speed up the processing of the US Census in 1890. He invented the first machine capable of processing statistical information from punched cards. Hollerith organized a company to manufacture and market his system. This company later became known as the International Business Machines Corporation (IBM).
IBM compatibles	A computer that uses IBM compatible operating system and software. Utilizes the Intel 8088, 8086, 80286, or 80386 processor.

BCAI/Data Processing/Concepts of Data Processing/TERMINOLOGY

Information Age	Our current stage of development. This time is known as the Information Age because there are currently more people who make a living from the management of information than from the manufacturing of a product.
Information processing cycle	The procedures used to process information. Consists of four steps: input, processing, output, and storage. After data have been processed, they must be stored for further use.
Input devices	Input devices are how the computer receives information to process. Examples include keyboards and mice.
Input	Raw data that are entered into the computer.
Integrated packages	Offer several programs in one bundle--usually a word processor, a spreadsheet, a database and graphics or communication programs.
Jacquard's Loom	A weaving loom invented by Joseph Jacquard in 1804 that used data processing techniques to form patterns on cloth.
K	A measurement of a computer's memory, 1,024 kilobytes.
Language translator	Every language, except for machine language, must be translated into zeros and ones. This function is performed by a computer program called a <i>language translator</i> . The language translator uses the program prepared by the programmer as input and produces the machine language as output.
Laser disk	Data are stored by burning tiny holes in the surface with a laser beam--the same technology as compact disk audio systems. Storage potential is very great.
Leibnitz wheel	A calculator designed by Gottfried Von Leibnitz that could add, subtract, multiply, and divide. It was built in 1671 but did not work very well due to the technology.
Machine Arithmetique	Invented by Blaise Pascal to multiply and divide in 1642. It was a calculator operated by turning dials.
Machine language	A computer language expressed in binary notation. All other languages must be converted to machine language before the computer will understand them.
Magnetic disk	Data are recorded as magnetized spots. These disks may be either floppy or hard, and they are available in several sizes. Information is recorded to and read from the disks by a read/write head located in the disk drive which senses the magnetic spots.
Magnetic tape	Cassette tapes or tape drives that are used as storage devices. The tape is oxide coated.
Main memory	Considered to be primary storage and is used for current computations.

BCAI/Data Processing/Concepts of Data Processing/TERMINOLOGY

Mainframe	Computers built to minimize the distance between points for very fast operations. Used for extremely complicated computations.
MARK I	Howard Aiken developed the Mark I in 1944. The MARK I obtained data from punched cards, made calculations with the aid of mechanical devices, and punched the results into a new set of cards. This machine was controlled automatically by instructions punched into paper tape attached to the computer. Therefore, it was the first machine to use a stored program concept, but was not an electronic machine.
Master file	A file that contains relatively permanent records.
Math coprocessor	A math coprocessor is a dedicated microprocessor that is especially designed to handle floating point calculations. This frees up the computer's regular microprocessor so computing speed is enhanced.
Memory cache	A memory cache is part of the computer RAM that is used to store information frequently requested from the hard disk. It is usually 64K and the program works with it automatically. A memory cache can speed up a system dramatically.
Menu	A list of options provided to the user by the computer program.
Microcomputer	Smallest computers and largely owned by individuals. The name comes from the fact that its main computing component is located on one integrated circuit or chip.
Minicomputer	Moderate sized computer. Used when a desktop computer is not powerful enough to do the job.
Modem	A modem is a piece of hardware that can send and receive digital signals over telephone lines. They can be either internal (located within the computer case), or external (in a separate case of their own).
Mouse	A mouse is a pointing device for the computer screen. The mouse is moved along a desktop, and the movements of the mouse on the desktop are digitally matched to the movements of a pointer or cursor on the computer screen. A mouse allows commands to be chosen from on-screen menus foregoing the necessity of typing in the commands every time they are used.
MS-DOS	The primary operating system for IBM compatible microcomputers. MS-DOS allows access to 640K of RAM and various sizes of hard and floppy disks.
Napier's bones	Invented by John Napier in 1614, Napier's bones was used for computations. Made up of rods or bones.
Operating system	The operating system is a computerized set of instructions that specify how the computer will manipulate data fed into it. The operating system sets parameters for all data processing functions and is necessary on all types of computers.

BCAI/Data Processing/Concepts of Data Processing/TERMINOLOGY

OS/2	Advanced operating system for IBM compatibles which Microsoft designed in cooperation with IBM for its new family of PS/2 computers; is considered the state-of-the-art operating system for managing information in the personal computer. It allows multitasking and will only work on 286 and 386 computers.
Output	Communicating the results of the processing of the user.
PASCAL	Named for Blaise Pascal, a French inventor. This language is probably experiencing the most rapid growth rate. Very powerful, flexible, and self-documenting. Should soon gain acceptance in the business world. Used on microcomputers and taught on the high school level to beginners.
PL/I	Programming Language I. IBM's answer to language with shortcomings such as FORTRAN and COBOL. Can be used for both scientific and business applications. This is a problem-oriented language.
Processing	Takes place when facts are manipulated to produce results.
Program	A series of instructions which directs the computer to perform a sequence of tasks that produce a desired output.
Programmer	Person who designs, writes, tests, and implements the programs which process data.
RAM disk	Allocating part of a computer's extra memory as a RAM disk. A RAM disk can be any size from 64K to 360K. It is used to speed access to the hard disk. Often programs will access the same information many times during the course of running. Accessing a RAM disk is about 100 times faster than accessing a hard disk.
Random access memory	(RAM)--where programs in use are stored. This memory also stores data before they are processed. The memory is erased when the computer is turned off. If the program is to be used again, it has to be reloaded into the main memory.
Read only memory	(ROM)--contains chips that store permanent instructions for the computer. The user has no access to this memory to erase it.
Record	A group of related fields.
Recording	Putting data in some form that is recognizable by person or machine
Registers	These are memory locations within the CPU where the CPU holds data for processing. The larger the registers, the larger and more powerful the CPU. The common sizes are 8, 16, and 32 bit.
Resolution	The number of dots used to make up an image.
RPG	Report Program Generator. Developed in about 1964 as a special purpose language for processing data to generate and print reports.

BCAI/Data Processing/Concepts of Data Processing/TERMINOLOGY

Secondary memory	This is recorded memory that the processor can access to perform its programming. On-line storage is memory that can be reached electronically; off-line storage is memory that requires mechanical assistance.
Sectors	Each track on a floppy disk is organized into a number of sectors, each separated by a space. Some disks come with sectors prerecorded at the factory. This is called a <i>hard-sectored</i> disk. Disks without prerecorded sectors are called <i>soft-sectored</i> disks. Soft-sectored disks must be <i>formatted</i> before they can be used.
Sequential Access	Data are retrieved in the order they were stored, one record after another. Mainly used for batch processing. It is the only retrieval method that can be used for magnetic tape.
Software	All instructions and information necessary to make the computer function. Computer programs used to accomplish specific applications are considered to be software.
Sorting	Putting data in alphabetical or numerical order in ascending or descending order.
Spreadsheets	Programs that perform mathematical calculations on columns and rows of numbers. Spreadsheets are usually used for business accounting.
Storing and retrieving	Storing data on some type of media for future use.
Summarizing	Condensing data and information.
Supercomputers	Large computers with fast processing speeds that can access billions of characters of data. The CRAY is one of the best known examples of supercomputers.
Tracks	Information is stored in concentric rings called tracks on a floppy disk.
UNIVAC I	The first commercial computer, it was manufactured by Sperry Rand in 1951. General Electric and Metropolitan Life Insurance were the first companies to utilize the Univac I for business purposes. The cost was \$1.5 million, and it contained 500 vacuum tubes.
User	The person using the computer.
Utilities	These are programs designed to enhance and improve PC operations. Many are available as public domain disks.
Video controller	The computer's video screen must be refreshed 30 times a second. If the CPU had to do this, it would have little time to perform its other functions. It is the job of the video control card to manage the computations necessary to maintain the viewscreen.

BCAI/Data Processing/Concepts of Data Processing/TERMINOLOGY

Winchester disk drives

Developed by IBM, early hard disks were called this because their storage capacity was two disks at 30Mb each--similar to the caliber of the famous Winchester rifle (30/30).

Word processing

Programs that deal with the processing of words for letters, research papers, books, etc.

BCAI/Concepts of Data Processing/RESOURCES

MEDIA

COMPUTER BASICS

Filmstrip

Glencoe Publishing Co.

A COMPUTER GLOSSARY

16 mm film, 10 minutes

Encyclopedia Britannica Educational Corporation

COMPUTER HARDWARE: WHAT IT IS AND HOW IT WORKS

Vocational Media Associates

COMPUTER INDUSTRY

16 mm film, 11 minutes

AIMS Instructional Media Services, Inc.

COMPUTER VISIONS

Video

Southwestern Publishing Co.

COMPUTER, THE

16 mm film, 11 minutes

AIMS Instructional Media Services, Inc.

COMPUTERS

16 mm film, 11 minutes

BFA Educational Media

THE COMPUTER: WHAT IT CAN--AND CAN'T--DO

Vocational Media Associates

REFERENCES

ART OF USING COMPUTERS, THE

Lincoln Andrews, M. J. Fujimoto,

Annette J. Thompson

Boyd and Fraser Publishing Co.

COMPUTER CONCEPTS

Marilyn Bohl

SRA

COMPUTER INFORMATION SYSTEMS

David Adams, Gerald Wagner

South-Western Publishing Co.

COMPUTERS

Larry and Nancy Long

Prentice Hall

COMPUTERS AND INFORMATION PROCESSING

William Fuiro and Lawrence Aufiero

Prentice Hall

COMPUTERS IN BUSINESS

Larry Long

Prentice Hall

COMPUTERS AND THEIR APPLICATIONS

Larry Long

Prentice Hall

CONCEPTS IN INFORMATION PROCESSING

Mimi Will and Donette Dake

Prentice Hall

INTRODUCTION TO COMPUTERS AND INFORMATION PROCESSING

Larry Long

Prentice Hall

LEARNING CONCEPT: INTRODUCTION TO PERSONAL COMPUTERS

Vocational Media Associates

MICROCOMPUTERS, SOFTWARE AND APPLICATIONS

Dennis P. Curtain and Leslie R. Porter

Prentice Hall

SILICON VALLEY: THE MAKING OF THE PC

Paul Freeberger and Michael Swaine

Borland, Osborne, and MicroPro

McGraw-Hill Publishers

USING COMPUTERS TODAY

David Sullivan, T. G. Lewis, Curtis Cook

Houghton Mifflin Company

USING MICROPROCESSORS AND MICROCOMPUTERS

Joseph D. Greenfield, William C. Wray

Joseph Wiley and Sons, Inc.

ADDITIONAL SOFTWARE

INTRODUCTION TO MICROCOMPUTER APPLICATIONS

MAVCC/East Texas State University

Apple II Family, TRS 80 III

IBM PC

LEARNING TO USE THE DISK OPERATING
SYSTEM
Southern Computer Systems, Inc.
IBM PC

SUGGESTED UNIT LESSON PLAN

SECTION I: DATA PROCESSING

UNIT II: DATA ENTRY PROCEDURES

ESSENTIAL 75.87
ELEMENT: (e)(1)(D)(E)

ALLOCATED
TIME: 15 Hours

UNIT OBJECTIVE: Students will use the touch system of keyboarding, will build greater speed and accuracy in data entry, and will understand the advantages of data entry skills for computer users.

STUDENT
OBJECTIVES:

After completing this unit, the student will be able to:

1. Identify and correctly use the additional keys on a computer keyboard
2. Demonstrate correct finger use for touch typing
3. Type with increased speed and accuracy
4. Describe the advantages of using a mouse in moving around the keyboard

FOCUS:

Despite advances toward more sophisticated input techniques, such as text scanners and voice recognition, keyboarding remains the principal method of original data entry. Computer keyboards, which historically came in many varieties, are now approaching a greater degree of standardization. Students will benefit from the time they invest in developing and improving their data entry skills.

DOMAINS:

Activities and competency tests have been designed to provide learning experiences utilizing the affective, cognitive, and/or psychomotor domains.

BASIC SKILLS:

Activities and competency tests have been designed to reinforce the basic skills of reading, writing, and/or mathematics.

CONTENT OUTLINE

- I. General comparison between the computer keyboard and the electronic keyboard
 - A. Basic keyboarding techniques
 - 1. Learning to type with a computer
 - 2. Entering data
 - a. Entering data with the alphabet keys
 - b. Entering data using the numeric keys
 - c. Regular number keys
 - B. The use of special keys on the computer keyboard
 - 1. Special keys
 - a. Cursor movement keys
 - b. Other specialized keys
 - c. Function keys
 - d. System control keys
 - C. Hints on gaining speed
 - 1. Unlearning incorrect fingering
 - 2. Effectiveness of typing fast
 - D. Hints on gaining accuracy
- II. Using a mouse
 - A. Definition
 - B. Advantages
 - C. Operating a mouse
 - D. Menus
 - 1. Concept of nested menus
 - 2. Pop-up and pop-down menus
 - 3. Writing custom menus
 - E. Using a mouse with dialog boxes
 - F. Graphic interfaces

SUGGESTED TEACHER ACTIVITIES

General Teacher Preparation

1. Preview the unit and review objectives.
2. Decide on a variety of instructional methods to present the unit.
3. Prepare questioning techniques and closure statements.
4. Make modifications in curriculum for special needs students.
5. Consult several alternative sources to enhance and update your knowledge of the current trends, issues, and processes related to the unit content.
6. Select exercises, drills, and other resources to use as supplemental materials for the unit.
7. Secure and prepare sufficient quantities of software backup diskettes for student use.
8. When appropriate, take a field trip or have a guest speaker present a portion of the unit describing industry standards.
9. Prepare appropriate bulletin boards and transparencies.
10. Make copies of appropriate handouts, activities, and test materials.
11. Secure overhead projector, LCD computer panel for data projection, and an appropriate screen.

General Classroom Preparations

1. Secure the students' attention.
2. Communicate learning expectations--goals to be accomplished.
3. Emphasize the value/importance of the unit content or activity.
4. Relate unit content to prior or future learning.
 - a. Use discussions and pretests to determine prior knowledge of the unit content.
 - b. From the results of the discussions and pretests, modify your teaching plans to fit student needs.
 - c. Use enthusiasm, and relate the content to the student's interests.

Reteach Activities

1. Use a new method to reteach a unit activity.
2. Using additional resources, create individualized materials for the more and less capable students.
3. Utilize those sections of tests which need additional reinforcement.
4. Utilize unit activities not previously used.
5. Use peer practice for the reteaching of terminology--one student asks about the meaning of a word. The other student has the list of answers (words). Hints will be given until the word is matched with its correct definition.

Specific Teaching Activities

1. Most teachers will be faced with a mix of students who know keyboarding and students who do not. It is advantageous for students to learn keyboarding by touch; however, you should not spend too much time helping students who missed typewriting classes to progress to the skill level of the experienced students.
2. Many very good software programs that teach keyboarding skills are available for a nominal cost. These programs work without supervision, and many are very game-like and fun to work with. These types of programs would be an excellent resource for helping those students who missed typing to develop their skills. See the resource section for a complete list.
3. As graphic interfaces and graphics programs become more popular, the use of a mouse is becoming increasingly important in the microcomputer world. Mice also speed the operation of many other types of programs, and are available for a nominal cost from many computer dealers. Prices start around \$50. Even if your lab is not equipped with mice, you can still teach concepts such as menus and dialog boxes using your keyboard. It is suggested that your class visit a computer store, business, or school computer lab that uses mice in order that students can see how they are used.
4. This is a time to observe your students and catch their technique errors. Walk around the room as they are keyboarding exercises and give them personal suggestions on improvements that they might make.

Activity Two

- Project 1 Touch-typing software is needed to complete this activity. This software is readily available, inexpensive, and is the best source for teaching touch-typing skills.
- Project 2 Secure several exercises for the students to type and print off. Require them to proofread and make on-screen corrections right from the start.
- Project 3 Secure ten-key by touch, data entry software. This will work two ways, it will teach the ten-key adding machine and improve numerical data entry.

Activity Three

You will probably need to use two types of keyboarding software--one program that will individually teach typing to students with little or no keyboarding skills and another program that is strictly for skill building. Make sure that the students keep track of their speed and accuracy. After they have worked on the skill-building software for a few days, then organize competition where they can only record a score if it is 95% correct or better, the speed has increased a specified number of words, etc. You may wish to give bonus points for those who get 100% accuracy. Do not let the keyboarding stop here. Have students take two to three timed writings immediately as they walk in the classroom.

Activity Four

Project 1

Have the students show what they find, and for each new type of menu or dialog box found, prepare a place in the classroom to display them. Discuss the differences.

Project 2

Demonstrate how to use a mouse. Discuss where and how it is connected. Have students work in pairs and have them move it around on a document that you have prepared. Prepare a worksheet for them to fill in when they get to a specific location. Ideally there should be several machines equipped with mice.

NOTE: If this is not possible, have a student that has a mouse bring it to class and demonstrate it, or ask a local computer dealer to come and demonstrate its use.

ANSWERS TO ACTIVITIES

Activity One

1. D
2. E
3. G
4. A
5. B
6. C
7. F
8. L
9. M
10. N
11. H
12. K
13. P

14. J
15. Q
16. T
17. O
18. U
19. V
20. I
21. R
22. Y
23. S
24. Z
25. W
26. X

Activity Two

Projects 1-3

Evaluated to the satisfaction of the instructor.

Activity Three

Evaluated to the satisfaction of the instructor.

Activity Four

Projects 1 and 2

Evaluated to the satisfaction of the instructor.

COMPETENCY TEST ANSWERS

1. Answers will vary: computer has more keys, function keys, control keys, etc.
2. a s d f j k l ;
3. 7 8 9
4 5 6
1 2 3
4. Punctuation
5. NumLock
6. Cursor
7. Light Emitting Diode
8. Arrow
9. PageUp
10. PageDown
11. Home
12. End
13. Backspace
14. Enter
15. Escape
16. ScrollLock
17. PrintScr
18. Delete
19. Insert
20. Function
21. Control
22. Numbers
23. A user who can enter data fast is much more effective than one who cannot.
24. Errors may be repeated in later processing steps.
25. A. Commands can be selected from screen
B. No typing, no memorization
C. Moving around screen is easier
26. A pointing device for the screen.
27. Point, click
28. Point
29. Click
30. When more than one button on a mouse is pressed at once
31. Menu
32. Nested menu
33. Dialog

TERMINOLOGY

Arrows	These keys move the cursor one space in any of the four directions.
Backspace	Moves the cursor back one space, deleting whatever character occupied that space.
Chording	Pressing two or three buttons on a mouse at once.
Click	Pressing one, two or three buttons on a mouse.
Delete	This key can be used to delete screen characters that are highlighted by the cursor.
Dialog boxes	These are boxes containing choices from which the user can select. The operation of the program is greatly simplified and made easier by the use of dialog boxes.
End	Moves the cursor to the lower left space on the screen.
Enter	This key is used to tell the computer to process whatever instruction was just typed.
Escape	This special key is usually program-specified to escape from certain programs or menu structures.
Function keys	Usually, 10 or 12 keys that can be assigned functions by the software application program.
Home	Moves the cursor to the upper left space on the screen.
Insert	This key can be used to add characters from the scrap. (May differ from application program to application program.)
Menus	A menu is simply a list of commands arranged by the programmer in a certain area, usually along the top or bottom of the screen.
Mouse	A pointing device for the computer screen.
Nested menus	A set of menus arranged in a tree structure.
Number Pad	The ten-key arrangement of numbers on the right side of the keyboard.
NumLock	Enables the number key pad to be used for entering numbers.
PageDown	This key moves the document <i>down</i> one screen.
PageUp	This key moves the document <i>up</i> one screen.

BCAI/Data Entry Procedures/TERMINOLOGY

Point	Point means to move the mouse until it points to whatever option or command you want to enter.
Pop-down menus	Menus that are designed to pop down from the top of the screen when their parent command is selected.
Pop-up menus	Designed to pop up when their parent command is selected.
PrintScr	Prints the screen when depressed. (May not work on some application programs.)
ScrollLock	Changes the functions of the cursor movement keys (arrows, etc.) from moving the cursor, to moving the document within the screen window.
System control keys	Keys used in combination with other keys to allow other keys to perform more than one function.

TEXT/WORKBOOKS

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Bobbs-Merrill

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South-Western Publishing Co.

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APPROACH
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CONSULTAMATION, INC.
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Glencoe Publishing Co.

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COMPLETE COURSE
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AND APPLICATIONS
Houghton Mifflin Co.

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KEYBOARD MASTERY AND
APPLICATIONS COMPLETE COURSE
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ISSUES RELATED TO KEYBOARDING
Data Base

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Business Education Forum

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The Balance Sheet

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TUTORING VS./AND "LIVE" INSTRUCTION
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A LEGAL TYPING SIMULATION
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BUSINESS EDUCATION
Business Education Forum

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A COMPLETE COURSE
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South-Western Publishing Co.

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South-Western Publishing Co.

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TEN-KEY TOUCH DRILLS
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TYPEWRITING: A MASTERY APPROACH FOR IBM
SELECTRIC TYPEWRITERS COMPREHENSIVE
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South-Western Publishing Co.

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MPC Educational Publishers

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PRACTICE
South-Western Publishing Co.

WORD PROCESSING CONCEPTS &
APPLICATIONS
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TYPEWRITING PRACTICE SET
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SOFTWARE

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Apple II, Ile, Franklin; 2 diskettes
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*GREGG KEYBOARDING FOR
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Apple II, 3 diskettes
Gregg/McGraw-Hill and Control Data Corp.

GREGG TYPING, SERIES EIGHT, TIMED WRITINGS
Microcomputer: IBM PC or XT
Software Memory Requirements: 128k
Number of Drives Required: 2
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(Optional), DOD 2.0 or higher
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Microcomputer: Apple IIc, Ile; IBM PC, XT
Tandy 1000

Software Memory Requirements: 128k

Number of Drives Required: 1

Special Peripheral Equipment Needed: 80-column
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HOUGHTON MIFFLIN TYPEWRITING TIMED WRITING SOFTWARE

Microcomputer: Apple IIc, Ile, IBM PC, XT
Tandy 1000

Software Memory Requirements: 128k

Number of Drives Required: 1 or 2

Special Peripheral Equipment Needed: 80-column
parallel printer, Class Management Disk

Houghton Mifflin Co.

KEYBOARD MASTER

Apple II, Ile

Encyclopedia Britannica Educational Corp.
Software Center

KEYBOARDING FOR THE INFORMATION PROCESSOR

Microcomputer: Apple IIc, Ile, II + ; IBM PC
Glencoe Publishing Co.

KEYBOARDING FOR THE PHYSICALLY HANDICAPPED

Microcomputer: Apple II + , Ile or IIc;

TRS-80 Model III or 4; IBM PC or PC jr.

Software Memory Requirements: 48k, 64k

Number of Drives Required: 1

Special Peripheral Equipment Needed: Printer
(Optional) DOS

Gregg Division of McGraw-Hill Book Co.

KEYSTROKES: KEYBOARDING FOR INFORMATION ENTRY

Microcomputer: Apple II, II + , IIc or Ile; IBM
PC; TRS-80 Model III or 4

Number of Drives Required: 1

Special Peripheral Equipment Needed: None
Houghton Mifflin Co.

MASTER TYPE

Microcomputer: Apple, Commodore 64, IBM PC

Software Memory Requirements: 64k

Number of Drives Required: 1

Special Peripheral Equipment Needed: None
Scholastic Produced Software & Books

MICROCOMPUTER KEYBOARDING

Apple II, IIE, Franklin; 4 diskettes
South-Western Publishing Co.

PACING SOFTWARE FOR PROGRESSIVE TYPEWRITING SPEED PRACTICE

Microcomputer: IBM PC or XT
Software Memory Requirements: 128k
Number of Drives Required: 1
Special Peripheral Equipment Needed: None
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SMARTYPE-A KEYBOARDING PROGRAM

Microcomputer: Apple II Plus
Software Memory Requirements: 64k
Number of Drives Required: 1
Special Peripheral Equipment Needed: Printer
(Optional), Language Card
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SUPERKEY

Microcomputer: Apple, Apple Classpack
Software Memory Requirements: 48k
Number of Drives Required: 1
Special Peripheral Equipment Needed: None
Scholastic Produced Software & Books

TYPE!

Microcomputer: Apple, C64, IBM
Software Memory Requirements: 64k
Number of Drives Required: 1
Special Peripheral Equipment Needed: None
Scholastic Produced Software & Books

TYPING IS A BALL, CHARLIE BROWN

Microcomputer: Apple, Commodore
Software Memory Requirements: 64k
Number of Drives Required: 1
Special Peripheral Equipment Needed: None
Scholastic Produced Software & Books

ADDITIONAL SOFTWARE

BUSINESS QUIZ: TYPING

Career Aids
Apple II, IIE, IIC 32k

EXECUTIVE SPELLER

Glenco Publishing
Apple II, IIE, IIC 48k
IBM PC 64K

FIFTY TYPING PICTURE PROJECTS

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HOW FAST CAN YOU TYPE RIGHT?

Barron Enterprises
Learning Services

INSTRUCTOR'S COMPUTER DIRECTORY

Instructor Publications
Apple II, IIE, IIC 48K
IBM PC; XT, AT, PS2 128k

KEY ENTRY III

Southern Computer Systems, Inc.
IBM PC

KEYWORDS

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Apple II, IIE, IIC 48k

LETTER MAN

Career Aids
Apple II, IIE, IIC 48k
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MASTERTYPE

Mindscape Software
Amiga
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Macintosh, Macintosh +
IBM PC; XT, AT, 128k

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MICROTYPE II: CHALLENGING WORD

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TYPING INSTRUCTOR
Career Aids
IBM PC 64k

TYPING STRATEGY
Career Aids
Apple II, IIE, IIC 48K
IBM PC; 64k

TYPING TUTOR IV
Learning Services
Apple II, IIE, IIC IIGS 48K
IBM PC; XT, AT, 128k
Amiga
Macintosh, Macintosh +

TYPING TUTOR PLUS WORD INVADERS
Career Aids
Apple II, IIE, IIC 64k
IBM PC; 64

TYPING WELL
Career Aids
Apple II, IIE, IIC 48K

SECTION I: DATA PROCESSING

UNIT I: CONCEPTS OF DATA PROCESSING

UNIT OBJECTIVE:

Students will demonstrate understanding of data processing concepts and terminology, exhibit familiarity with data processing components, and execute various data processing procedures.

STUDENT OBJECTIVES:

After completing this unit, the student will be able to:

1. Identify the functions and terminology related to data processing
2. Identify and explain the relationship of the parts of the information processing cycle
3. Draw a time line of the historical events related to data processing
4. Compare the similarities and differences of the various sizes of computer systems
5. Specify and evaluate hardware components of the computer system
6. Compare and contrast various computer languages

GENERALIZATION:

General computer operation and background knowledge is necessary in order to understand the more complex computer programs.

1. The ability to identify basic data processing terms is essential in the day-to-day use of data processing equipment.
2. Understanding each part of the information processing cycle and how the parts work together is imperative. The student can then process data, and, at the same time, understand how the data was processed.
3. Identification of various computer systems is important in choosing the system most suitable for the task at hand.
4. Understanding the history of data processing is necessary to understand the development of computers and to evaluate future development.
5. Categorization and definition of computer languages allow the student to decide which language is most effective in specific problem solving.
6. As networked and multi-user systems become more common in today's business world, students should understand concepts related to these areas.

UNIT OVERVIEW

- I. Basic concepts of data processing
 - A. Data processing is the handling or manipulating of information in order to achieve a desired result.
 - B. Functions of data processing
 1. Data collecting--Collecting raw data that needs to be processed
 2. Recording--Putting data in some form that is recognizable by person or machine
 3. Sorting--Putting data in ascending/descending alphabetical or numerical order
 4. Classifying--Arranging data according to some logical relationship
 5. Calculating--Performing mathematical operations
 6. Storing and retrieving--Storing data on some type of media for future use
 7. Summarizing--Condensing data and information
 8. Communicating--Transferring data from one place to another
 - C. Information processing cycle consists of four steps: input, processing, output, and storage. After data has been processed, it must be stored for further use. All functions of data processing are used in the information processing cycle.
 1. Input--The raw data that needs to be processed. Before data can be processed, it has to be entered into the computer. An example of raw data is three scores that need to be averaged: 80, 85, 90. Data is input into the computer by input devices. It is very important that the correct data is input in order for the processing to be done correctly. If the input is wrong, the output will be wrong.
 2. Processing--When the facts are manipulated to produce results. The average of the three scores is the process: $(80 + 85 + 90) / 3$. The data is processed in the processor. The processor is considered to be the brain of the computer, and has five functions: (1) makes logical decisions; (2) makes arithmetic computations; (3) serves as temporary storage; (4) edits and moves data; and (5) controls input and output devices.
 3. Output--Communicating the results of the processing to the user. Output devices deliver the results of the processing. The output given for the grade average would be 85. This could be displayed on the screen or perhaps printed on paper.

4. Auxiliary storage--Storage outside of the main storage area. Auxiliary storage is needed in all types of computer systems. It expands memory capacity and allows access to data.

II. The history and development of data processing actually has early roots. However, it was not until the 18th, 19th, and 20th centuries, which comprise a period marked as the Industrial Revolution, that great strides in development were made. Computers were developed due to the increase of trading between cultures as business became more complex. The computer age or evolution of the computer has been referred to as the "mechanization of brains"--man learns how machines can help to do his thinking.

A. The following inventions contributed to the development of the computers of today and the future.

1. Fingers--Considered to be man's first calculating device. Early Roman schools taught finger counting.
2. Abacus--The first counting machine, used over 3000 years ago by the Chinese. Made up of rods and beads.
3. Napier's bones--Invented by John Napier in 1614, Napier's bones were used for computations. This invention was made up of rods or bones etched with numbers.
4. Machine arithmetique--Invented in 1642 by Blaise Pascal, the machine arithmetique was used to multiply and divide. It was a calculator operated by turning dials.
5. Gottfried Von Leibnitz--Designed a calculator that could add, subtract, multiply, and divide. It was built in 1671, but did not work very well, due to the inadequate technology of his time. This calculator was named the Leibnitz Wheel.
6. Jacquard's loom--A weaving loom invented by Joseph Jacquard in 1804 that used data processing techniques to form patterns on cloth.
7. Charles Babbage--Known as the father of computers. In 1833, Babbage designed a machine that used concepts which were very similar to those concepts used in today's computers. This machine was called the analytical engine. The machine was never built because Babbage was way ahead of technology, but he did leave many details for later inventors to use. If he had been successful, his machine would have been the first computer.
8. Herman Hollerith--Invented a technique to speed up the processing of the US Census. He developed Hollerith's punched card, which was used in the 1890 census. He invented the first machine capable of processing statistical information from punched cards. Hollerith organized a company to manufacture and market his system. This company later became known as the International Business Machines Corporation (IBM).

9. Ada Lovelace--Was a colleague of Charles Babbage's. She was the daughter of Lord Byron, which allowed her to finance much of Babbage's research. She was a mathematician, and is recognized as the first programmer.
 10. MARK I--Howard Aiken developed this in 1944. The MARK I obtained data from punched cards, made calculations with the aid of mechanical devices, and punched the results into a new set of cards. This machine was controlled automatically by instructions punched into paper tape attached to the computer. Therefore, it was the first machine to use a stored program concept. This was not an electronic machine.
 11. ENIAC--Considered to be the first electronic computer developed by Dr. John W. Mauchly and J. Presper Ecker under a contract from the U.S. Army. This machine contained thousands and thousands of vacuum tubes. ENIAC was completed in 1946.
 12. EDSAC and EDVAC--First electronic computers to utilize the store-program concept in the late 1940s.
 13. UNIVAC I--This computer was manufactured by Sperry Rand in 1951, and it was the first commercial computer. General Electric and Metropolitan Life Insurance were the first companies to utilize the Univac I for business purposes. The cost was \$1.5 million, and it contained 500 vacuum tubes.
- B. Computer generations--The development of computers is divided into four generations according to dates. These generations are listed below by dates with a short description of the developments of each period.
1. First--From about 1952 to 1968, generation-one computers were characterized by their use of vacuum tubes. These computers were very slow, expensive to run and build, and unreliable. Heat and maintenance were also major problems. Applications were usually payroll processing and record keeping. The IBM 650 and UNIVAC I are examples of first-generation computers.
 2. Second--From about 1959 to 1964, second-generation computers used transistors, which were smaller and required less power than vacuum tubes. Computers could now be programmed with English-like commands instead of numbers. Applications were batch-oriented, such as billing, payroll processing, and updating inventory files. The IBM 1401, Honeywell 200, and the CDC 1604 were second-generation computers.
 3. Third--From 1965 to 1970 was the introduction of the integrated circuit. Instead of large boards, circuits were developed on single chips of silicon. Third-generation computers were about 900 times faster than first-generation computers. IBM introduced its 360 series mainframe computer and the smaller, mini computer.

4. Fourth--Microprocessors derived from integrated circuits put microcomputers on the office desk. Fourth-generation computers are roughly 100 times smaller than first-generation computers. These processors were introduced in 1971.
5. Fifth--Many computer magazines and books have cited that we are now entering the fifth-generation of computing. Fifth generation computing is based on the advent of artificial intelligence operating systems. These operating systems use terminology very close to normal English syntax. Artificial intelligence systems are programmed with enormous banks of data based on expert opinion. When the user gives a command, the program will evaluate the command and if more input is necessary from the user, it will ask for it.

III. Types of computers--Computer systems vary widely in how the hardware is designed. However, what the hardware does is similar in all systems. Size is the most basic difference between computer systems. Four computer systems are listed below.

A. Supercomputers--Large computers with fast processing speeds that can access billions of characters of data.

1. The CRAY is one of the best known examples of supercomputers. The CRAY sells for about \$20 million. The services of two full-time engineers are included in the purchase price. Another example of a supercomputer is the CYBER.
2. Both are used in such applications as nuclear physics, meteorology, and petroleum engineering.
3. Installation requires a specially prepared subflooring to support the weight of the computer and special plumbing is needed to carry the fluoro-carbon fluid needed as coolant.
4. About 150 supercomputers have been installed through 1987.

B. Mainframe--computers built to minimize the distance between points for very fast operations. Used for extremely complicated computations.

1. Cost over \$400,000 and can exceed \$1,000,000
2. Serve more than one user because they support large networks of individual terminals and remote job-entry locations
3. Used by banks, large commercial and industrial companies, and government agencies. Most professional programmers work in a mainframe environment.

BCAI/Data Processing/Concepts of Data Processing/UNIT OVERVIEW

- C. Minicomputer--Moderate-sized computer. Used when a desk-top computer is not powerful enough to do the job.
 - 1. Can be relocated conveniently because they have no special power or environmental control requirements
 - 2. Smaller, slower, and less expensive than mainframes, but perform the same tasks as mainframes (only on a reduced scale)
 - 3. Cost between \$10,000 and \$40,000
 - 4. Store and retrieve data from the same type of input and output devices as mainframes do, but with a smaller storage capacity
- D. Microcomputer--The smallest computers, they are largely owned by individuals. The name comes from the fact that its main computing component is located on one integrated circuit or chip.
 - 1. The slowest computer, but the least expensive
 - 2. Limited in the volume of data it can process
 - 3. Fits on a desk or table
 - 4. Does not require a data processing expert to operate it
 - 5. Supports peripheral devices

IV. Hardware components of a computer system

- A. Central processing unit--All processing in the computer goes through the CPU. It is divided into two parts.
 - 1. Arithmetic logic unit--Allows comparisons to be made in order to make logical decisions.
 - 2. Control unit--Controls all operations of the processor.
- B. Main memory--Considered to be primary storage and is used for current computations.
 - 1. Read only memory (ROM)--Contains chips that store permanent instructions for the computer. The user has no access to this memory to erase it.

2. Random access memory (RAM)--Where programs in use are stored. This memory also stores data before it is recorded outside of the computer. An example is when a report is being typed using a word processing program. The report is stored in RAM until it is recorded on a disk. The memory is erased when the computer is turned off. If the program is to be used again, it has to be reloaded into the main memory.

C. Secondary storage media

1. Magnetic tape--Cassette tapes or tape drives are popular storage devices. The tape is oxide coated.
2. Magnetic disk--Data is recorded as magnetized spots. These disks may be either floppy or hard and they are available in several sizes. Information is recorded to and read from the disks by a read/write head located in the disk drive which senses the magnetic spots.
3. Laser disk--Data is stored by burning tiny holes in the surface with a laser beam--the same technology as compact disk audio systems. Storage potential is very great.
4. Bubble memory--Contains small magnetic bubbles on a thin single-crystal film of synthetic garnet. The presence or absence of a bubble is "on" or "off." Again, storage potential is very great.

D. Types of access to stored data

1. Sequential data is retrieved in the order it was stored, one record after another. Sequential data is mainly used for batch processing.
2. Direct or random access is when records can be read in order, regardless of how they were stored. Magnetic disks are direct access devices.

- V. Computer languages--The computer operates under or is controlled by the direction of a program. The sequence of steps to be performed must be translated into detailed instructions the computer understands. Therefore, the programs must be written in a computer language understood by the computer being used. There are six categories of computer languages.

A. Categories of languages

1. Level--Low-level languages are ones which require the programmer to have detailed knowledge of the computer hardware system. A high-level language is one that is fairly machine-independent in that little or no knowledge of specific computing machinery is required.
2. Purpose--If a language can be used to solve a variety of types of problems, they are considered to be general-purpose. If the problems to be solved are specific, they are special-purpose languages.

3. Structure--If it is relatively easy to implement the structure mechanisms, the language is considered to be structured.
4. Orientation--When programmers indicate the procedures or algorithms in solving a problem, they use a procedure-oriented language. A programmer can specify what is to be accomplished in a problem-oriented language, leaving the development of procedures to the language.
5. Translation--Every language must be translated into zeros and ones except for machine language. Translation is performed by another computer program called a language translator. The language translator uses the program prepared by the programmer as input and produces the machine language as output.
6. Interaction--This means the programmer can conduct a dialogue with the computer--enter a line of code, have the computer test it, do an arithmetic computation, etc., in any order and at any time.

B. Low-level computer languages

1. Machine language--A computer language expressed in binary notation. All other languages must be converted to machine language before the computer will understand them. Each computer has its own unique machine language written in binary code.
2. Assembly language--Developed in the early 1950s to make using machine language easier. Assembly language replaced the binary code with symbolic names that were easier to remember.

C. High-level languages--A computer language that uses English-like commands. Easier than machine language. These do not require the programmer to have working knowledge of the computer's internal components. Some popular computer languages are listed below.

1. BASIC--Beginner's All-purpose Symbolic Instruction Code--BASIC was developed at Dartmouth college to help students learn to program. It is simple and flexible and can be learned by people with no programming experience. It can be used for a wide variety of applications and is the primary language for microcomputers.
 - a. Advantages--BASIC is, perhaps, the easiest language to learn. It is easy to use on microcomputers to retrieve data from mainframe data files. It is very flexible and has good diagnostic messages.
 - b. Disadvantages--BASIC lacks standardization, has limited transportability, slow execution speed, and has an unstructured nature.

2. FORTRAN--Formula Translator--This language was developed in 1956, primarily for engineering, mathematical, and scientific applications. It can quickly execute mathematical problems. FORTRAN is not well suited for file maintenance, editing of data, or production of documents. It is the oldest high-level language.
 - a. Advantages--FORTRAN is popular because it is widely used by programmers and there are many programs available that are written in FORTRAN.
 - b. Disadvantages--There is often a problem with compatibility among different versions which causes a problem with transportability.
3. COBOL--Common Business-Oriented Language was developed in 1960. COBOL was designed for business applications. It is a very popular procedure-oriented language. COBOL can store large amounts of data and be used for storing customer or employee information. It is used heavily in commercial and government computer installations. It is fairly easy to understand, maintain, and modify. Dr. Grace Hopper, of the U.S. Navy, was a strong force behind its development.
 - a. Advantages--COBOL is more like English than FORTRAN. It is easy to read and tends to be self-documenting. It is reasonably machine independent, therefore, programs are fairly transportable.
 - b. Disadvantages--COBOL requires a very large compiler. Compiling is very slow because there is so much to write.
4. PASCAL--Is named for Blaise Pascal, a French inventor. Pascal is a language for beginning programmers, but is more structured than BASIC. PASCAL requires a compiler which enables it to execute faster than some other languages. Its detailed graphics capabilities make it useful to scientists and business people.
 - a. Advantages--PASCAL is well suited for both batch and interactive uses. It is easy to use and is very powerful. PASCAL requires less memory, is easier to learn, and executes faster than other languages.
 - b. Disadvantages--This languages lacks sophisticated input and output capabilities which limits its use in business applications. It is not standardized, so transportability can be a problem.
5. RPG--Report Program Generator was developed in about 1964 as a special-purpose language for processing data to generate and print reports. RPG was designed to process data to generate and print business reports. It is commonly used for processing files for accounts receivable, accounts payable, inventory, and general ledger.

6. C--C is used for system programs, utility programs, and graphic applications. C can also be used for text processing and database programs. It has some capabilities of assembly language. Many commercial application program operating systems for all sizes of computers are now prepared using the C language. C has also been used to develop special effects in many files.
 - a. Advantages--Using C language speeds up the writing process for application programs from years to just months. It is machine independent and transportable, yet it provides the control of an assembler. C is user-oriented and machine-efficient. It is structured, allowing the programming to build complex programs out of simple parts. It is very fast and requires little storage space.
 - b. Disadvantages--C is a very difficult language to code and it is difficult to read.
7. ADA--Named in honor of Ada Lovelace. It was developed for use by the U.S. Defense Department in their search for a highly reliable language that could run on many different computers. It is a sophisticated language that produces very accurate results as needed in defense, weather forecasting, and oil exploration.
8. PL/1--Programming Language 1--PL/1 is used for both scientific and business applications. It combines commands found both in COBOL and FORTRAN as well as its own unique commands. It is a problem-oriented language.
 - a. Advantages--PL/1 is a modular language that is extensive and sophisticated.
 - b. Disadvantages--The compiler is very large. This prevents its use on microcomputers.
9. APL--A Programming Language is a symbolic interactive language used primarily by engineers, mathematicians, and scientists. It provides programmers with a "shorthand" that speeds up the process of coding.
 - a. Advantages--APL is a free-form style with a lack of restrictions on input and output. It has extremely powerful mathematical capabilities. APL is a fast language with fewer restrictions on data than any other language. It handles tables of information easily, a fact which makes it appealing to business application programmers.
 - b. Disadvantages--APL is very hard to read, requires a special keyboard, printer, and has very limited file handling capabilities. It requires a very large amount of storage and is not available for use on microcomputers.

10. FORTH--Designed as a forth-generation computer language. It is a fairly low-level language which was developed for microcomputers in the 1970s. The name FORTH was derived from FOURTH because file names were limited to five characters on the computer used to develop this language.

- a. Advantages--FORTH is an excellent control language for the computer because it is close to assembly language. It is good for industrial process control applications. It is the standard control language for astronomical observatories. IBM and Hewlett Packard are just two of the many industry leaders using FORTH for in-house development.

- b. Disadvantage--FORTH has only limited vocabulary function.

D. Criteria for selecting computer languages

1. Speed
2. Purpose of the program
3. Time and money required to design and code a program
4. Availability of languages on the system used
5. Storage requirements of the compiler
6. Language standardization and transportability
7. Potential equipment changes in the future

VI. Microcomputers

A. Types of microcomputer systems

1. IBM compatibles
 - a. The 8088 (XT) is a 16-bit processor with an 8-bit data bus. It is capable of addressing 640K of memory and is the oldest and slowest of the IBM compatibles, but it is effective for many applications. It usually runs at 4.77 to 10 Mhz and is the most common processor for business applications.
 - b. The 8086 is a 16-bit processor with a 16-bit data bus. It usually runs at 8 to 12 Mhz and is a faster processor. The PS/2 models 25 and 35 fall into this category.
 - c. The 80286 (AT) is the business standard for effective data processing on a microcomputer. It is a 16 bit-processor running at 6-20 Mhz.

- d. The 80386 is the fastest and best microprocessor available. It is a 32 bit processor running at 16 to 25 Mhz with a 32-bit data bus. It is very fast and efficient, even for complicated applications like graphics and CAD.

2. The Apple family of microcomputers

- a. The Apple IIe is a well-known and very functional microcomputer in the area of education. Business applications are, however, somewhat limited. The Apple IIe uses a 16-bit processor, the Motorola 6502, with an 8-bit data bus.
- b. The Apple IIe is a larger and faster computer, but still not widely used in business. It also uses the Motorola 6502 processor but adds additional memory and a color monitor.
- c. The Macintosh is a very fast and functional microcomputer. It uses the Motorola 68000 series processor, with a 32-bit chip. It comes with a high resolution color monitor, a mouse, and has a graphics interface which makes it very easy to use. Though not as widespread as the IBM compatibles, the Macintosh is often used for business applications.

B. Microcomputer system hardware components

- 1. CPU (Central Processor Unit) can be thought of as the brain of the computer. Traditionally, it is one processor doing one job at a time in one computer.
 - a. The common processors
 - (1) MS-DOS machines--Intel 8088, 8086, and 80286--16 bit; and the Intel 80386--32bit
 - (2) Apple family of computers--Macintosh, Motorola 68000 series--32 bit; Apple IIe, Motorola 6502--16 bit
 - b. Parts of the CPU
 - (1) The clock is a crystal that vibrates at a high frequency. Clock speed is measured in millions of cycles per second or MegaHertz(Mhz). Common clock speeds vary from 1.7 to 25 Mhz.
 - (2) The bus is the nervous system of the computer. The bus connects the CPU to itself and to the other components of the system. The bus connects many different points at once, but communication can only take place one message at a time. This is why bus

width is important. The width of the bus is the number of bits that it can carry at once. The following are some common widths and computers they are used in: 8-bit--XT's and Apple IIe's, 16-bit--AT's and lower PS/2 line, and 32-bit--386's and upper PS/2 line.

- (3) Registers are memory locations within the CPU where the CPU holds data for processing. The larger the registers, the larger and more powerful the CPU. The common sizes are 8-, 16-, and 32-bit. Each CPU has a number of registers, some for special purposes:

- * The instruction register holds location of next instruction to be executed.
- * The decoding unit decodes instructions read from memory.
- * The accumulator is the main register for containing data which is being manipulated.
- * Working registers are additional registers that hold the data and addresses being manipulated.

- (4) Arithmetic/logic unit is used for some instructions required for arithmetical or logical operations to be carried out on data. The ALU does this.

2. Primary memory

- a. There are several functions of primary memory.

- (1) Stores the program being executed
- (2) Stores the data being used by that program
- (3) Stores the operating system of the computer
- (4) Serves as a buffer between fast and slow operations
- (5) Represents screen images

- b. Memory is organized into a sequence of locations.

- (1) The locations are numbered--each number is called an address.
- (2) The byte or word in an address is called that address's contents.

c. Types of primary memory

- (1) Read Only Memory (ROM) cannot be changed. It is set at the factory by the manufacturer. These include such operations as how to start the computer and how to handle the screen.
- (2) Random Access Memory (RAM) can be changed. The processor can read and write this memory. RAM must have continuous power to keep its data intact. Because of this it is referred to as volatile. RAM is stored in chips. These chips are grouped in multiples of eight. Common sizes for microcomputers are 64K and 256K.

d. Memory is measured in K or Kilobytes. Some common sizes for microcomputers are:

- (1) 64K is considered adequate for basic applications.
- (2) 128K is much more versatile.
- (3) 312K is the lower end for professional quality word processors and business programs.
- (4) 512K is a good figure for average word processing and business programs.
- (5) 640K is the limit of MS-DOS and the standard for most higher level graphics and desktop publishing programs.
- (6) 1Mb(1000K) is standard for most AT based programs and the IBM PS2 line. Also the low-end mark for effective multitasking (running more than one program at once).
- (7) 2Mb and up may be required by some graphics, multitasking, windows, PS2, and other advanced programs.
- (8) Secondary memory is recorded memory that the processor can access to perform its programming.
- * On-line storage is memory that can be reached electronically.
- * Off-line storage is memory that requires mechanical assistance.

C. Peripheral devices for storing data

1. Floppy disks
 - a. Made of mylar plastic which is coated with a surface that can record magnetic images
 - b. Housed inside a protective jacket
 - c. The disk drive writes on the disk through the read/write window which is a small notch located in the upper right corner of the disk.
 - d. Information on the disk can be protected by placing a foil tab over the read/write window. This is called a write protection tab and it keeps the read/write head of the drive from recording information on the disk.
 - e. Disk storage structure
 - (1) Information is stored in concentric rings called tracks.
 - (2) Each track is organized into a number of sectors, each separated by a space. Some disks come with sectors prerecorded at the factory. This is called a hard-sectored disk. Disks without prerecorded sectors are called soft-sectored disks. Soft-sectored disks must be formatted before they can be used.
 - (3) Data on disks is organized into files. A particular file may contain either program or data and must have a file name of up to eight characters and a period followed by a file extension of three letters. (example: DOCUMENT.DOC, MSword.HLP, Autoexec.bat)
 - f. There are several sizes of disks available.
 - (1) Currently the 5.25 inch disk is most popular. It is used on both the Apple and MS-DOS machines. The capacity for an Apple disk is 140K, and the capacity for a MS-DOS disk is 360K or 1.2Mb.
 - (2) The 3.5 inch disk is quickly taking over the market place. It has a hard plastic case and is sometimes called "a stiffy." It has a capacity of 720K or 1.44Mb.
 - g. Floppy disks must be protected.
 - (1) Physical damages--fingerprints, extremes in temperature, bending, dirt, dust, and being written on with a ball point pen

- (2) Magnetic interference--magnets, televisions, radios, and some telephone receivers.

2. Hard disks

- a. Hard disks were developed by IBM. The early ones were called Winchester disk drives because their storage capacity, two disks at 30Mb each, was similar to the caliber of the famous Winchester rifle (30/30). Standard sizes from 20 to 370 Mb.
- b. Access time is the time it takes to retrieve a specific piece of information and is usually measured in special clean environments and must remain sealed throughout their use to reduce the possibility of contamination.
- c. The read/write head flies over the surface of the hard disc at about 1/1,000,000 of an inch. A particle of dust would be 100 times this size. Hard disks must be manufactured in special clean environments and must remain sealed throughout their use to reduce the possibility of contamination.
- d. Whenever a hard disk is moved, the DOS command "Park" should be issued so that the read/write head can be positioned in a safe place so as not to crash into the surface of the disk and possibly damage the disk or the information on the disk.

3. Optical disk

- a. Storage systems use the same laser disk technology used in the recording of music on compact digital disk audio systems. The storage capacity is 300Mb.
- b. Many read-only disks are now available which contain such useful information as the *United States Zip Code Directory*, *Compton's Unabridged Dictionary*, and *The Encyclopedia Britannica*.

4. Bernoulli boxes

- a. Devices that are located externally to the computer
- b. Store data on either 10 or 20Mb removable cartridges, allowing unlimited storage

5. Hard cards

- a. Devices which allow 20 to 40 Mb of storage to be placed on an expansion port and used as an extra disk drive
- b. Low cost and do not require an open disk drive slot

D. Input/output devices are used to receive and send information

1. Keyboards are the classic input device for computers. They are inexpensive and effective.
 - a. Standard XT keyboards have 88 keys. The letters and numbers are laid out like a typewriter. The function keys are on the left and the arrow keys are on the right.
 - b. Enhanced 101 key or AT keyboards have several extra keys including an extra set of number keys arranged on a number pad so that entering data through the ten-key by touch method is simplified. The AT keyboard also adds two extra function keys and places all function keys in a single row above the regular number keys.
 - c. Apple keyboards do not have function keys; however, they do have the open-apple and close-apple keys which in combination with other keys operate as function keys.
2. Mice are pointing devices used with the computer screen. The mouse is moved along a desktop, and the movements of the mouse on the desktop are digitally matched to the movements of a pointer or cursor on the computer screen. A mouse allows commands to be chosen from on-screen menus foregoing the necessity of typing in the commands every time they are used.
 - a. Mechanical mice track desktop movement by measuring the movements of a rolling ball housed in the puck which is pulled across the surface. The mechanical mouse will work on any flat desktop surface.
 - b. Optical mice track movement by measuring changes in the puck's position in an underlying coordinate grid in the mouse pad. An optical mouse will only work when moved on top of the optical grid pad.
3. Monitors
 - a. Features to consider are:
 - * The screen resolution is an important consideration. Resolution means how many dots are used to make up an image. The computer screen is composed of many little dots called pixels. The pixels visually blend together to form an image. The more pixels there are on a screen, the clearer that screen's images will be.

- * Color monitors must use three pixels. These three pixels are three different colors; red, green, and blue--the primaries of light. The composite color image is formed by turning on these three primary colors in various combinations and intensities. Using three pixels in place of one decreases the resolution. To remain at a comparable level of resolution with the monochrome monitor, the color monitor must have three times as many pixels.
- b. Types of monitors available
 - * IBM Color Graphics Adapter (CGA) monitors have the lowest resolution. CGA monitors will display four colors at a resolution of 640 by 200 pixels. This is adequate for some applications. The CGA monitors are the least expensive color monitors.
 - * EGA monitors are good quality color monitors. EGA stands for Enhanced Graphics Adapter. It is the next step up in display resolution. The EGA display will show any 16 colors at once out of a total of 64 colors, at a resolution of 640 by 350 pixels.
 - * Hercules monochrome monitors have similar resolution to the EGA. This monitor is driven by the Hercules compatible graphic adapter. It provides a resolution of 752 by 350 lines in two colors. This display has acceptable resolution for most applications, and is by far the most cost-effective display system available with many companies selling both monitor and display adapters as a kit for under \$100. Monitors are available in either amber on blue, green on white, or black on white.
 - * Vector Graphics Array (VGA) monitors have the highest resolution currently available. These monitors start at a resolution of 640 by 480 pixels and go up to around 1200 by 1000 pixels. VGA monitors can display 256 colors out of a palette of at least 4000.
- 4. Printer types
 - a. Dot matrix printers represent characters by selecting certain dots out of an established matrix. This matrix is nine dots high and 12 dots wide. For a higher quality print, the pattern of dots is moved slightly and repeated which results in a more dense pattern of dots. These darker letters are called near-letter quality.

- b. A 24-pin dot matrix printer uses two rows of twelve pins to create a matrix that is 12 dots high and 30 dots wide. However, the size of the character is the same size as the characters normally produced by nine-pin printers. The quality approaches that of laser printers so, 24-pin printers are often referred to as letter-quality. Color option kits are also available for 24-pin printers making them an excellent candidate for graphics applications.
 - c. Daisy wheel printers use a wheel with letters and characters on the end of spokes which are rotated and hit with a hammer to strike the paper--much like a normal typewriter. Daisy wheel printers are an economical source of letter-quality documents, but have no graphics capability.
 - d. Laser printers use the same thermal transfer engine as personal photocopiers. Because of this, their quality is very high. The resolution of the laser printer is 300 Dots Per Inch (DPI). This means that the laser printer constructs text and graphics from a matrix of dots so dense, there would be 9000 (300 by 300) of them in a square inch. Some of the newer ones are in the 600 dots per inch range. This resolution is referred to as typeset quality.
 - e. Postscript laser printers can reproduce anything that can be produced on the computer. The Apple Laser Writer was the first postscript printer. It has a page description language that is available on many of today's laser printers.
 - f. Ink jet printers offer similar resolution to that of the laser printer and are less expensive. They are also lightweight and make good portable printers.
 - g. Plotters use a computer-controlled pen to draw images and are used exclusively for graphics. Pens can be changed to produce almost any color. A plotter can draw any image the computer can produce.
5. Modem
- * A piece of hardware that can send and receive digital signals over telephone lines. They can be either internal--located within the computer case, or external--in a separate case of their own. The Hayes compatible is the most widely used type. Modems generally come in three speeds: 300, 1200, and 2400 baud.

E. Internal hardware

1. Math coprocessor--A math coprocessor is a dedicated microprocessor that is especially designed to handle floating point calculations. This frees up the computer's regular microprocessor so computing speed is enhanced. A math coprocessor is essential for CAD and other advanced graphics. Some large spreadsheets may also require math coprocessors.
2. Extra memory cards--Extra memory cards can be added to enhance the computer's performance. This is often necessary for graphics applications.
 - RAM disk--One way to use extra memory is through the allocation of part of the extra memory as a RAM disk. A RAM disk can be any size from 64K to 360K. It is used to speed access to the hard disk. Often programs will access the same information many times during the course of running. Accessing a RAM disk is about 100 times faster than accessing a hard disk.
 - Memory Cache--A memory cache works much the same way except that it is smaller, usually 64K, and the program works with it automatically. A memory cache can speed up a system dramatically.
3. Replacement motherboards--As the 80286 and 80386 systems became available, so did many replacement mother boards for the old 8088 processor. These boards use the same chassis and peripherals as the standard 8088 XT system did, except that the 8088 motherboard is replaced with a motherboard which carries the 80286 or 80386 processor. This results in a dramatic increase in computing speed and power without the purchase of an entirely new system. The catch is that the computer still has to access input/output devices and peripherals through the XT's old 8-bit data path.
4. Graphics coprocessor--A graphics coprocessor is a dedicated processor which frees the central processor from the task of computing information for the display. For high level CAD and graphics applications, they can result in a dramatic increase in speed and performance.

F. Operating systems -- the programs that control the operation of the computer and its associated devices that are usually sold with the computer. They are designed for a particular microprocessor, and will not run on other hardware.

1. The operating system is a computerized set of instructions that specify how the computer will manipulate and data feed into it. The operating system sets parameters for all data processing functions and is necessary on all types of computers. It tells the computer where and how to communicate with disk drives, monitors, keyboards, and other

devices. There are several types of operating systems: MS-DOS, PS/2, APPLE-DOS, and PRO-DOS.

2. The MS-DOS operating system was developed by Bill Gates at MicroSoft Corporation and is the primary operating system for IBM microcomputers. Version 1.0 of this operating system was first introduced in 1981. It is predicted that OS/2 will supersede MS-DOS as the operating system of choice by the end of 1990.
3. Most Apples use DOS 3.3 as their operating system. The total disk capacity is 163,840 bytes. The Apple Disk Operating System 3.3 is stored on tracks 0, 1, and 2 and it writes one sector (256 bytes) at a time to the disk. As DOS writes files to disk, one sector at a time, the sectors may not be continuous.
4. The APPLE PRODOS 1.1--Professional Disk Operating System--is faster, easier to use, and more powerful than DOS 3.3, the old disk operating system. The ProDOS operating system is generally stored on a startup disk. The computer is booted with this startup disk, then the disk is removed. (This is similar to MS-DOS system disks.) The system disk contains: utilities, a language processor, a user interface shell to guide users through the necessary file, and disk handling utilities.

G. Applications software--Pre-packaged software written by professional programmers and sold for use by less experienced persons.

1. Word processing programs deal with the processing of words for letters, research papers, books, etc. Some examples are MicroSoft Word, PFS Professional Write, Word Perfect, and Wordstar.
2. Spreadsheets are programs that perform mathematical calculations on columns and rows of numbers. They are usually used for business accounting. Of all the business-related programs available, spreadsheets probably have the widest use. These were available on micros before they became available for larger systems. Some examples of popular business spreadsheet packages include Lotus 1-2-3, Excel, Multiplan, and Quattro.
3. Databases are programs designed to organize and sort lists of information. The sophistication of many of the database programs now available makes them practical for both business and home use. Some examples of popular business database packages include Dbase III and Reflex.
4. Graphics programs such as paint, drawing, and desktop publishing programs are designed specifically for the graphic representations of data. There has been no area of development which has advanced more than graphics. Some examples include: Deluxe Paint 2000, AutoCAD, Xerox Ventura, Harvard Graphics, and PageMaker.

5. Communications programs allow for communication between computers over phone lines.
6. Integrated packages offer several programs in one bundle--usually a word processor, a spreadsheet, a database, and graphics or communication programs. Examples include Microsoft Works, Apple Works, and Symphony.
7. Utilities are programs designed to enhance and improve PC operations. Examples include Norton Utilities and Tornado. Many are available as public domain disks.
8. Programming languages for microcomputers are available for the microcomputer. These include: BASIC, Pascal, Macro Assembler, COBOL, and FORTRAN. These programs include compilers and are very good for education and general purpose programming.

VII. Mini and mainframe computer systems

- A. Small business computer systems--A small business system is often part of an upward compatible family of computers. *IBM System/36* is an example of a small business system and may have the following features:

1. Hardware

- a. CPU--the CPU consists of two computing elements

- (1) Systems processor--performs all system level functions
- (2) Execution processor--performs all computations

- b. Storage

- (1) Memory--640K and up
- (2) Disk--fixed-disk drives: two fixed-head disk drives, each with the ability to store 27.1 megabytes
- (3) Diskette--The diskette drive can hold up to three individual diskettes and up to two magazines. Each magazine holds up to ten diskettes.

- c. Peripherals

- (1) Workstations--The operator communicates with the computer by responding to system or program generated messages displayed on the CRT. Data can also be entered from the operator's console.

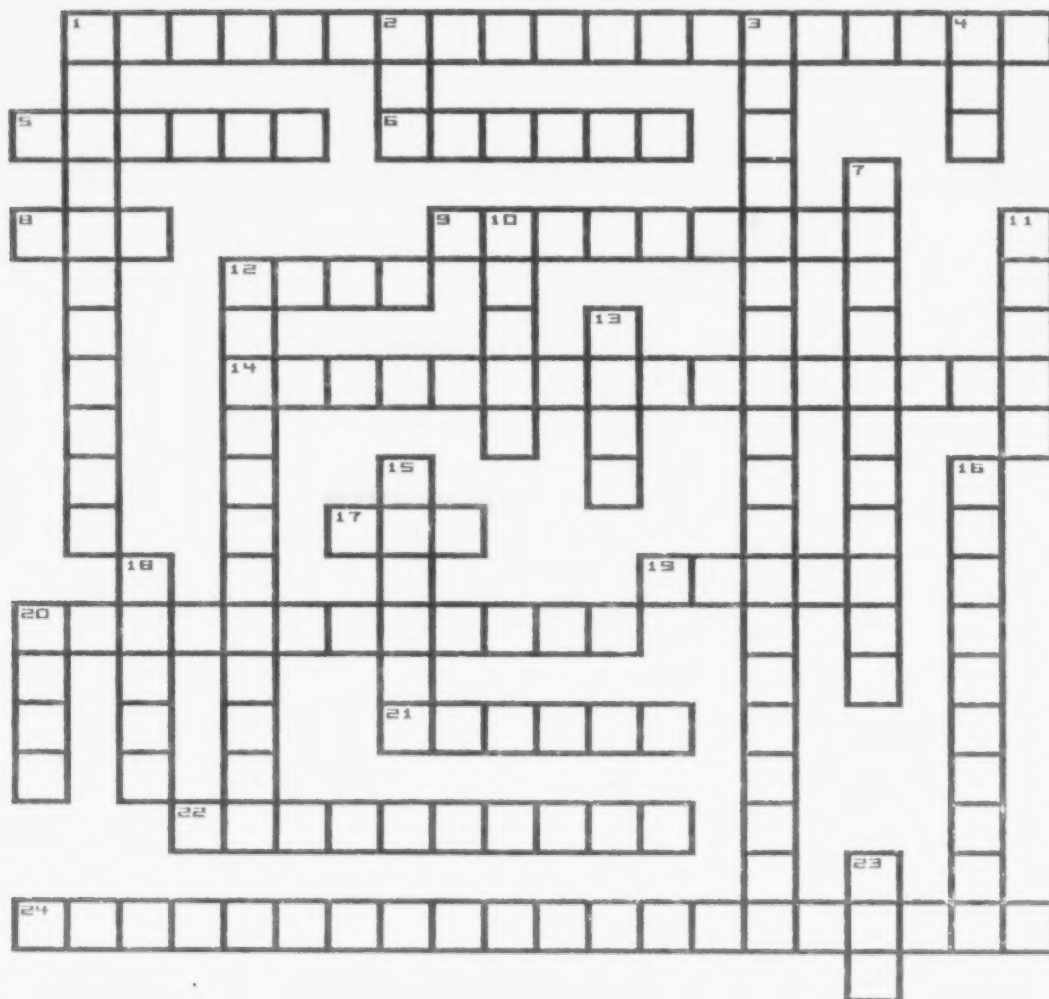
- (2) Printer--5211 model 2--Since the print belt selected has 48 different characters, approximately 300 lines per minute can be printed.
 - d. System expansion--The system can be expanded by adding:
 - (1) More memory
 - (2) Additional fixed-disk drives
 - (3) Disk drives with higher storage capacity
 - (4) More workstations with faster printers
 - (5) Additional diskette drives
 - (6) A communication adapter
 - (7) Workstations to be added at remote locations.
- 2. Software
 - a. System Support Product (SSP)--Provides the function of the operating system
 - b. Utilities Program Product (UPP)--Assists in maintaining files, entering data, formatting screens, and sorting files
 - c. RPGII compiler--The programmer writes all in-house programs in RPG, COBOL, BASIC, and assembler language are also available
 - d. Interactive communication feature--Permits the system to work in an interactive distributed network
- B. Typical mainframe configurations--IBM System/370--The IBM System/370 is a family of upward-compatible general-purpose computers used for a variety of data processing applications that provide a wide range of performance levels and processor storage capacities. The individual computers of this family are referred to as models or processor complexes.
 - 1. Hardware
 - a. The central processing unit is the controlling center of the computer.
 - (1) Addressing main storage
 - (2) Fetching and storing data
 - (3) Arithmetic and logical processing of data

- (4) Executing instructions in a desired sequence
 - (5) Initiating communication between main storage and input/output devices
 - (6) The processor and main storage are typically housed in what is called the "BOX"
- b. Main storage provides the system with directly addressable fast access storage of data.
- c. Operator facilities provide for manual operation and control of the system. They include
 - (1) Operator-to-machine communication
 - (2) Indication of machine status
 - (3) Control over the setting of the time-of-day clock
 - (4) Initial program loading
 - (5) Resets and other manual controls for operator intervention in normal machine operation
 - (6) This is all done through the system console, a dedicated screen and keyboard.
- d. Channels are the direct controllers of I/O devices and control units.
- e. I/O devices--fall into a number of categories, some of which overlap. They are used in and for
 - (1) Auxiliary storage--Machine and manual input
 - (2) Data communications--Reading of external documents and displays
 - (3) Process control
 - (4) Data acquisition
- f. Input/output interface--Provides a uniform method of attaching various I/O devices (through control units) to a channel. The information format and the control signal sequences provided by the interface are independent of the type of control unit and channel. Input/output operations transfer data between main storage and I/O devices.

- g. Control unit function provides the logic circuitry and the storage areas (buffers) needed to operate the attached I/O devices.

TERMINOLOGY CROSSWORD PUZZLE

Project 1



CROSSWORD PUZZLE CLUES

ACROSS CLUES

1. Written by professional programmers, then packaged and sold for use by persons less experienced.
5. Language named for a French inventor and probably the most rapidly growing.
6. The first counting machine.
8. Contains chips that store permanent instructions for the computer.
9. Computers built to minimize the distance between points for very fast operations.
12. Considered to be primary storage and is used for current computations; main ____.
14. Paint, drawing, and desktop publishing programs.
17. The nervous system of the computer.
19. The first electronic computer which contained thousands and thousands of vacuum tubes and was completed in 1946.
20. Moderate sized computer.
21. Concentric rings where information is stored on a floppy disk.
22. The number of dots used to make up an image.
24. Sped up the processing of the U.S. Census in 1890.

DOWN CLUES

1. A mathematician recognized as the first programmer.
2. Multipurpose language developed by the U.S. Department of Defense.
3. Contains information that identifies each sector as part of a file or an empty sector.
4. Where programs in use are stored.
7. A part of RAM that is used to store information frequently requested from the hard disk.
10. Has a maximum character set of 128 codes; 0 through 127. Used mostly with microcomputers.
11. Pointing device for the computer screen.
12. Cassette tapes or tape drives that are used as storage devices.
13. The person operating the computer.
15. Communicating the results of the processing of the user.
16. Person who designs, writes, tests, and implements the programs which process data.
18. Raw data that are entered into the computer.
20. A list of options provided to the user by the computer program.
23. Binary Coded Decimal.

Project 2

INSTRUCTIONS: Match the following words with their definitions.

UNIVAC	intelligence	Mouse	laser	databases	engine
supercomputer	punched	loom	assembly	secondary	CPU
clock	resolution	cycle	ENIAC	operating	random
primary	abacus	Winchester	Pascal	integrated	bus
translated	extension	function			

- Sorting, recording, and classifying are _____ of data processing.
- Input, processing, output, and auxiliary storage are part of the information processing _____.
- The first counting machine was the _____.
- Jacquard invented a _____ in 1804.
- Herman Hollerith invented a machine that used _____ cards to speed the processing of the 1890 census.
- Charles Babbage conceptualized but could not build the analytical _____ in 1833.
- The first electronic computer was the _____ and was completed in 1946.
- The _____ was the first commercial computer and was built by Sperry Rand.
- Third generation computers were spawned by the development of _____ circuits in 1965.
- Fifth generation computers are based on artificial _____.
- The Cray is a _____ and sells for \$20 million.
- All processing is done by the _____.
- The computer can read and write _____ access memory.
- Magnetic tape and disks are known as _____ storage media.
- The set of instructions that control basic computer operations is called the _____ system.
- Every computer language must be _____ into binary 0's and 1's before it can run on the computer.

BCAI/Data Processing/Concepts of Data Processing/ACTIVITY ONE (Continued)

17. _____ language was developed in the early 1950s to make using machine language easier.
18. This powerful language was named after French inventor Blaise _____.
19. The _____ crystal vibrates at a high frequency and synchronizes operations of the entire system.
20. The _____ can be thought of as the nervous system of the computer.
21. The program and data currently being used are stored in the _____ memory.
22. The three letters following the period in MS-DOS file names are called the file _____.
23. The popular name of the original IBM hard disk was a _____ disk.
24. A pointing device for the computer screen that rolls on a desktop is called a _____.
25. The number of dots used to make up an image is known as the _____.
26. _____ printers produce 300 dpi output.
27. _____ are application programs designed to organize lists.

FUNCTIONS OF DATA PROCESSING

INSTRUCTIONS: Describe the functions of data processing listed below.

1. Summarizing
2. Calculating
3. Data collecting
4. Sorting
5. Communicating
6. Recording
7. Storing and retrieving
8. Classifying

PARTS OF THE INFORMATION PROCESSING CYCLE

INSTRUCTIONS: Draw and label a diagram showing the information processing cycle and describe each step in the cycle.

TIME LINE OF HISTORICAL EVENTS

Project 1

INSTRUCTIONS: Match the dates shown below to the events that correspond to them.

	YEAR	EVENT
1. _____	1614	A. Analytical engine
2. _____	1890	B. Microprocessor
3. _____	1946	C. Jacquard's loom
4. _____	1804	D. UNIVAC
5. _____	Late 1940's	E. Leibnitz wheel
6. _____	1833	F. Napier's Bones
7. _____	1971	G. IBM 360
8. _____	1642	H. EDSAC and EDVAC
9. _____	1944	I. Hollerith's Punched Card
10. _____	1671	J. MARK I
11. _____	1951	K. ENIAC
12. _____	Late 1960's	L. Machine arithmetique

Project 2

INSTRUCTIONS: Draw a time line illustrating the development of calculating machines and computers in the history of data processing, starting with fingers and ending with microprocessors. Include at least one characteristic to describe each machine shown on the time line.

COMPARISON OF COMPUTER SYSTEMS

Project 1

INSTRUCTIONS: Explain the capabilities and limitations of the following computer systems.

1. Supercomputer
2. Mainframe
3. Minicomputer
4. Microcomputer

Project 2

INSTRUCTIONS: Evaluate the capabilities and limitations of computer systems and correlate them to the business situations listed below.

	BUSINESS SITUATIONS	COMPUTER SYSTEMS
_____	1. Fifteen thousand student school district	A. Supercomputer
_____	2. Word processing operator	
_____	3. Accounting office with five employees	B. Mainframe
_____	4. Medical secretary	
_____	5. Very small community hospital	C. Minicomputer
_____	6. Major airline	
_____	7. Data processing center for a major factory	D. Microcomputer
_____	8. Law firm with four lawyers	
_____	9. Elementary school teacher	
_____	10. College student	

Project 3

INSTRUCTIONS: Interview six people who use computers on the job. Ask what type of system is used and why. Take notes on each interview. Prepare a short summary comparing why various computers are used in different jobs. Listed below are examples of questions which could be asked.

1. What type of computer system is used in this business?
2. What criteria were used in the decision to buy this system?
3. How many systems were compared before the purchase?
4. How much did the system cost?
5. What applications are used the most on the system?
6. How much time is the computer used daily?
7. How much training were the employees given when learning how to use the system?

Project 4

INSTRUCTIONS: Look through a variety of computer and business magazines and select pictures of computer systems. Prepare a poster that identifies each computer system by the four types studied. If possible, include prices and descriptions.

HARDWARE COMPONENTS

INSTRUCTIONS: Prepare a notebook containing pictures of various computer hardware components, cost, description, and other information specified by your teacher.

COMPUTER LANGUAGES

INSTRUCTIONS: Answer the following questions regarding computer languages using complete sentences.

1. List six ways to categorize computer languages.

1.

2.

3.

4.

5.

6.

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BCAI/Data Processing/Concepts of Data Processing/ACTIVITY SEVEN (Continued)

2. Explain the difference between procedure- and problem-oriented languages.
3. List the language or languages in which most business programs are coded.
4. Identify a problem-oriented language.
5. Name a new language which is becoming very popular for writing microcomputer applications.
6. Name the language Grace Hopper played a role in developing.
7. Identify the oldest high level language.
8. Name the primary language for microcomputers.
9. Identify the language which provides programmers with a shorthand to speed up the process of coding.
10. Name the language used by the U.S. Department of Defense.
11. Name the language which made machine language easier.

COMPETENCY TEST

PART I: DATA PROCESSING TERMINOLOGY

Project 1

INSTRUCTIONS: Fill in the correct term next to the appropriate definition.

- _____ 1. Copies made in case the original is damaged.
- _____ 2. Device used to connect computers through phone lines.
- _____ 3. When facts are manipulated to produce results.
- _____ 4. Computer generation that used transistors.
- _____ 5. Series of instructions telling the computer how to access peripherals and disk drives.
- _____ 6. Equals one character.
- _____ 7. Putting data into a form that is recognizable by person or machine.
- _____ 8. Access when data can be retrieved in any order.
- _____ 9. Storage outside the main storage area.
- _____ 10. Physical components of the computer system.
- _____ 11. Used in measuring computer memory; equals 1024 bytes.
- _____ 12. Person who writes programs.
- _____ 13. A program that interprets computer statements written in another language and converts them to machine language.
- _____ 14. Access when data are retrieved one record after the other.
- _____ 15. Instructions to the computer.
- _____ 16. The invention of integrated circuits led to which generation of computers?
- _____ 17. The generation of computers which was inspired by microprocessors and put computers on the desktop.
- _____ 18. A term used for secondary storage.

BCAI/Data Processing/Concepts of Data Processing/COMPETENCY TEST (Continued)

- _____ 19. The Intel 8088 is an example of this.
- _____ 20. A term used for secondary storage.
- _____ 21. Synchronizes all operations in a microcomputer.
- _____ 22. The smallest computers--largely owned by individuals.
- _____ 23. A supercomputer that costs \$20 million and includes the full-time services of two engineers for life.
- _____ 24. The memory location where the CPU holds data for processing.
- _____ 25. Memory that is stored on chips on the motherboard and cannot be changed by the user.
- _____ 26. A 5 1/4 inch disk with a storage capacity of 360K.
- _____ 27. Disks which are usually called the C: drive and store 20 mg or more of data.
- _____ 28. A pointing device for the computer screen.
- _____ 29. An 8088 based IBM computer is known as this.
- _____ 30. The number of dots used to compose an image.
- _____ 31. Operating system developed by Bill Gates at Microsoft.
- _____ 32. A dedicated processor which frees the CPU from floating point calculations.
- _____ 33. Computer generation that used vacuum tubes.
- _____ 34. The fact that more people make their living from the management of information than from the manufacturing of a product has led to our time being called this.
- _____ 35. Computer generation that utilizes artificial intelligence.
- _____ 36. Information on a floppy disk can be protected by placing a write protection tab over this.
- _____ 37. The computer in the Apple family that uses the Motorola 6800 32 bit processor.
- _____ 38. A 32 bit processor running at 16-25 MHz.
- _____ 39. The nervous system of the CPU.

BCAI/Data Processing/Concepts of Data Processing/COMPETENCY TEST (Continued)

- _____ 40. Part of the computer that stores the program and data being executed.
- _____ 41. Volatile memory that can be written and read by the CPU.
- _____ 42. Storage device that uses 10 to 20 mg removable cartridges.
- _____ 43. An MS-DOS filename and extension may be up to this many characters, counting the period between.
- _____ 44. Early IBM hard disks were called this because of their 30/30 mg. storage capacity.
- _____ 45. A type of printer that produces 300 dpi resolution.
- _____ 46. A storage device that allows 20-40 mg. of storage to be placed on an expansion port without taking up a disk drive space.
- _____ 47. The highest resolution color monitor available.
- _____ 48. The most recent IBM operating system that allows multi-tasking and is compatible only with the 80286.
- _____ 49. Programs that perform mathematical calculations on columns and rows.
- _____ 50. People, hardware, and software working together is known as this.

Project 2

INSTRUCTIONS: Briefly describe each function of data processing.

1. data collecting
2. recording
3. sorting
4. classifying

BCAI/Data Processing/Concepts of Data Processing/COMPETENCY TEST (Continued)

5. calculating
6. storing and retrieving
7. summarizing
8. communicating

PART II: PARTS OF THE INFORMATION PROCESSING CYCLE

INSTRUCTIONS: List and describe each step of the information processing cycle.

1.

2.

3.

4.

PART III: EVENTS IN HISTORY

INSTRUCTIONS: Select the appropriate answer for each of the questions concerning the history of data processing. Place your answer in the space provided.

- _____ 1. This was not a computer, but it used data processing techniques in the 1800s.
- a. Napier's Bones
 - b. Abacus
 - c. Jacquard's Loom
 - d. Leibnitz Wheel
- _____ 2. This machine was never built, but the concepts in the design were similar to the concepts of today's computers.
- a. Analytical Engine
 - b. ENIAC
 - c. Leibnitz Wheel
 - d. Abacus
- _____ 3. The Orientals used this as a counting device.
- a. Napier's Bones
 - b. Abacus
 - c. Leibnitz Wheel
 - d. Machine Arithmetique
- _____ 4. The counting of the U.S. Census was done with the help of this device.
- a. Analytical Engine
 - b. Hollerith's Punched Card
 - c. MARK I
 - d. ENIAC
- _____ 5. This calculator operates by turning dials.
- a. Machine Arithmetique
 - b. Napier's Bones
 - c. Abacus
 - d. Jacquard's Loom
- _____ 6. Considered to be the Father of Computers
- a. Herman Hollerith
 - b. Blaise Pascal
 - c. Joseph Jacquard
 - d. Charles Babbage

BCAI/Data Processing/Concepts of Data Processing/COMPETENCY TEST (Continued)

_____ 7. Considered to be the first programmer.

- a. Charles Babbage
- b. Ada Lovelace
- c. Blaise Pascal
- d. John Napier

_____ 8. The first computer to be used commercially.

- a. ENIAC
- b. UNIVAC I
- c. MARK I
- d. EDSAC

_____ 9. Considered to be the first electronic computer.

- a. MARK I
- b. UNIVAC I
- c. EDSAC
- d. ENIAC

_____ 10. First machine to use the stored-program concept.

- a. MARK I
- b. UNIVAC I
- c. EDSAC
- d. ENIAC

11. Write a paragraph about the four computer generations, distinguishing each generation from the other.

PART IV: COMPARISON OF COMPUTER SYSTEMS

INSTRUCTIONS: List the four types of computer systems and describe each one.

1.

2.

3.

4.

9

PART V: COMPUTER COMPONENTS

INSTRUCTIONS: Make a notebook with pictures and data on the newest and best hardware available. Your teacher will give you specific instructions on this project and the due date.

PART VI: COMPUTER LANGUAGES

INSTRUCTIONS: Match the language with the appropriate descriptions.

	LANGUAGE		DEFINITION
_____	1. BASIC	a.	language experiencing a rapid rate of growth; named after a French inventor
_____	2. FORTRAN	b.	IBM's answer to languages with shortcomings
_____	3. RPG	c.	language used primarily on micros and that is good to teach beginners
_____	4. COBOL	d.	developed by U.S. Department of Defense because of their need for standardization
_____	5. PASCAL	e.	generates reports
_____	6. ADA	f.	used mainly for business. Grace Hopper helped the development of this language
_____	7. C	g.	used primarily for solving scientific, engineering, and math problems
_____	8. FORTH	h.	used for industrial process control applications
_____	9. PL/I	i.	low-level language developed by AT&T

COMPETENCY CHECKLIST

ESSENTIAL ELEMENT: 75.87(e)(1)(A)(B)(C)

The students will be provided opportunities to: demonstrate comprehension of data processing terms; identify the major components of data processing; and identify and apply the functions of an operating system.

OBJECTIVE: Students will demonstrate understanding of data processing concepts and terminology, exhibit familiarity with data processing components, and execute various data processing procedures.

MASTERY NON
MASTERY

1. Identify the functions and terminology related to data processing.

2. Identify and explain the relationship of the parts of the information processing cycle.

3. Draw a timeline of the historical events related to data processing.

4. Compare the similarities and differences of the various sizes of computer systems.

5. Specify and evaluate hardware components of the computer system.

6. Compare and contrast various computer languages.

STUDENT NAME _____

SECTION I: DATA PROCESSING

UNIT II: DATA ENTRY PROCEDURES

UNIT OBJECTIVE:

Students will use the touch system of keyboarding, will build greater speed and accuracy in data entry, and will understand the advantages of data entry skills for computer users.

STUDENT OBJECTIVES:

After completing this unit, the student will be able to:

1. Identify and correctly use the additional keys on a computer keyboard
2. Demonstrate correct finger use for touch typing
3. Type with increased speed and accuracy
4. Describe the advantages of using a mouse in moving around the keyboard

GENERALIZATION:

Despite advances toward more sophisticated input techniques, such as text scanners and voice recognition, keyboarding remains the principal method of original data entry. Computer keyboards, which historically came in many varieties, are now approaching a greater degree of standardization. Students will benefit from the time they invest in developing and improving their data entry skills.

UNIT OVERVIEW

- I. General comparison between the computer keyboard and the electronic keyboard
 - A. Basic data entry techniques
 1. Learning to type with a computer-- fingering for letter keys is identical to fingering for a typewriter. Additional keyboard sections are different, such as the function and numeric keypads. The keyboard can be divided into separate parts for easier learning.
 2. Entering data
 - a. Alphabetic keys--Are thought of as those that are the same on any typewriter keyboard. They include
 - (1) Alphabet--The standard alphabet keys, those on the home row, and those above and below the home row.
 - (2) Top row numbers--These are in the same position as on a typewriter.
 - (3) Punctuation--These include the period, comma, semicolon, and others. These keys are also in the same position as on a typewriter, and can be activated by holding down the shift key and pressing.
 - b. Entering data using the numeric keys
 - (1) Numeric keypad (not available on all keyboards)--The numeric keypad is similar to a ten-key adding machine.
 - (2) Some keyboards combine the numeric keypad with cursor control function.
 - (a) Each of the nine keys will perform two separate functions selectable with the NumLock key.
 - (b) When the NumLock key is not depressed, the keys perform ordinary cursor movement control functions.
 - (c) When the NumLock is depressed, the keys can enter numbers in the standard ten-key by touch method. Most keyboards have a small LED (Light Emitting Diode) which comes on when the NumLock function is enabled.

BCAI/Data Processing/Data Entry Procedures/UNIT OVERVIEW

- c. Keyboards also have regular number keys above the alpha keys which may be used at any time to enter numbers, whether the NumLock key is depressed or not.

B. The use of special keys on the computer keyboard

- 1. Special keys--Are used for special computer tasks, and are not available on a typewriter.

- a. Cursor movement keys control cursor movement in relation to the screen, and perform the following functions:

- (1) Arrow keys move the cursor one space in any of the four directions. If the ScrollLock is depressed, these keys move the document one space in any direction.
- (2) PageUp key moves the document up one screen.
- (3) PageDown key moves the document down one screen.
- (4) Home key moves the cursor to the upper left space on the screen.
- (5) End key moves the cursor to the lower left space on the screen.
- (6) Backspace key moves the cursor back one space, deleting the character occupied in that space.

- b. Other specialized keys

- (1) Enter key is used to tell the computer to process whatever instruction was just typed. This is the same key normally thought of as a return on a typewriter.

(NOTE: On word processors, there is no need to hit the return key after every line entered. Word processors have a function called word wrap which automatically adjusts the line breaks to fit within the specified margins.)

- (2) Escape key is a special key that is usually program-specified to escape from certain programs or menu structures.
- (3) NumLock key enables the number key pad. Usually an LED also comes on.
- (4) ScrollLock key changes the function of the cursor movement keys (arrows, etc.) from moving the cursor to moving the document within the screen window.

BCAI/Data Processing/Data Entry Procedures/UNIT OVERVIEW

- (5) PrintScr key prints the screen when depressed. (This may not work on some application programs.)
 - (6) Delete key can be used to erase screen characters that are highlighted by the cursor.
 - (7) Insert key can be used to add characters from the scrap. (May differ from application program to application program.)
 - c. Function keys (vary with computer)
 - (1) Usually 10 or 12 keys that can be assigned functions by the software application program.
 - (2) On XT keyboards, the 10 keys are located to the left of the alpha keys, on AT keyboards, the 12 keys are on a top row located above the number and punctuation keys.
 - d. System control keys are sometimes used in combination with other keys to allow other keys to perform more than one function. Examples are CTRL, ALT, OPEN APPLE, and ESC.
- C. Hints on gaining speed
 - 1. Unlearning incorrect fingering--People who have experience with a computer keyboard, but have not learned the touch-typing method, usually have some bad habits to unlearn.
 - 2. A computer user, particularly one who enters a lot of data, is much more effective when able to type fast.
 - a. Pretest--Find typing speed prior to unit training
 - b. Minimum requirement--The level needed to achieve acceptable productivity for that particular application program
 - (1) Entering text through the keyboard by touch is very important for word processing.
 - (2) The ability to enter numbers on the number pad by touch is very important for spreadsheets and calculations.
 - (3) Many operations such as databases require data in both numeric and alphabetic formats.
- D. Hints on gaining accuracy
 - 1. Since any keystroke can be voided with the backspace key, keyboard accuracy on a computer becomes partly a matter of speed and efficiency.

BCAI/Data Processing/Data Entry Procedures/UNIT OVERVIEW

2. Errors that go unrecognized at the time they are made require different treatment and are more serious because the error can be perpetuated through later processing steps.
 3. Acceptable standards--For some applications, 100% is the only acceptable level. As a result, verifying or proofreading must be part of the data entry operation.
 4. Methods for measuring--Calculating accuracy can be done in the same manner as in typing courses, but error correction completed during data entry affects speed only. The computer can compare two versions of data and flag every discrepancy.
- II. Using a mouse--In recent years, application programmers have begun to rely heavily on the mouse. Nearly all software products currently on the market have drivers for several types of mice. This expansion began after the success of the Macintosh computer which used a graphic interface that made its operation much simpler.
- A. A mouse is a pointing device for the computer screen. The mouse moves along a desktop, and the movements on the desktop are matched with movements of the cursor on the screen.
 - B. The advantages of a mouse
 1. The primary advantage of using a mouse is that commands can be selected from the screen.
 2. This means that command names do not have to be typed in letter for letter, and therefore, they need not necessarily be memorized.
 3. Commands can be chosen from an on-screen display. A mouse also makes moving around the screen much simpler.
 - C. Operating a mouse is one of the simplest concepts involved with learning about operating a computer. It can be summed up by two words: point and click.
 1. Point means to move the mouse until it points to whatever option or command you want to enter.
 2. Clicking one of the mouse's one, two, or three buttons corresponds to the enter key used on a keyboard.
 - a. When there are two or three buttons, the buttons can be used for other functions.
 - b. When two or three buttons are pressed at once, it is known as chording.

- c. A two-button mouse can handle three separate functions and a three-button can handle seven.
- d. In addition, some programs resort to double-clicking (clicking twice within a relatively short time period).

D. Menus

- 1. The on-screen display from which commands are chosen with a mouse is called a menu.
- 2. A menu is simply a list of commands arranged by the programmer in a certain area, usually along the top or bottom of the screen. When the mouse points to and clicks on one of these commands, it is entered into the program.
- 3. Concept of nested menus--Often, programmers will set up commands in a tree structure.
 - a. Each time a command is clicked, the program takes the user one level deeper in the tree structure and brings up a sub-menu. Each sub-menu is nested inside a term or command on the next higher level.
 - b. This tree structure is similar to the file structure found on MS-DOS hard disks. The next higher level is often thought of as the parent of the lower level commands under it.
- 4. Pop-up and pop-down menus are designed to pop down (or up) when their parent command is selected. These menus are very efficient because they do not block or replace the parent menu; the entire structure is seen at once.
- 5. Many software programs allow the user to program custom menus of commands they use most often.

E. Using a mouse with dialog boxes

- 1. Many newer programs contain dialog boxes. These are boxes containing choices from which the user can select.
- 2. The operation of the program is greatly simplified and made easier. The user simply points and clicks.

F. Graphic interfaces

- 1. When the Macintosh Plus was introduced, it contained a graphic interface which made its operations much simpler.
- 2. All commands to the operating system could be selected from menus. This greatly simplifies the operation of the computer, and means that new users can be productive with far less training.

3. Similar interfaces have since been introduced for IBM compatible computers including Desqview, Microsoft Windows, and the PS/2 Presentation Manager.

MATCHING KEYBOARDING TERMINOLOGY

INSTRUCTIONS: Write the letter of the correct definition in the blank in front of the corresponding term.

- | | |
|--------------------------|---|
| 1. _____ PageDown | A. The _____ is the ten-key arrangement of numbers on the right side of the keyboard. |
| 2. _____ Home | B. The _____ keys move the cursor one space in any of the four directions. If the <i>ScrollLock</i> is depressed, these keys move the <i>document</i> one space in any direction. |
| 3. _____ Backspace | C. The _____ key moves the document <i>up</i> on the screen. |
| 4. _____ Number Pad | D. The _____ key moves the document <i>down</i> on the screen. |
| 5. _____ Arrow | E. The _____ key moves the cursor to the upper left space on the screen. |
| 6. _____ PageUp | F. The _____ key moves the cursor to the lower left space on the screen. |
| 7. _____ End | G. The _____ moves the cursor back one space, deleting the character which occupied that space. |
| 8. _____ PrintScr | H. _____ is normally thought of as a return key on a typewriter. |
| 9. _____ Delete | I. The _____ key is used to get out of certain programs or menu structures. |
| 10. _____ Insert | J. The _____ key enables the number key pad to enter numbers. |
| 11. _____ Enter | K. The _____ key changes the functions of the cursor movement keys (arrows, etc.) from moving the cursor to moving the document within the screen window. |
| 12. _____ ScrollLock | L. The _____ key prints the screen when depressed. |
| 13. _____ System control | M. The _____ key can be used to delete screen characters that are highlighted by the cursor. |
| 14. _____ NumLock | N. The _____ key can be used to put in characters from the scrap. |
| 15. _____ Mouse | O. The _____ are 10 or 12 keys that can be assigned functions by the software application program. |

BCAI/Data Processing /Data Entry Procedures/ACTIVITY ONE (Continued)

- | | | |
|-----------------------------|----|---|
| 16. _____ Chording | P. | The _____ keys are sometimes used in combination with other keys to allow other keys to perform more than one function. |
| 17. _____ Function keys | Q. | A _____ is a pointing device for the computer screen. |
| 18. _____ Menu | R. | To _____ means to move the mouse until the cursor points to whatever option or command you want to enter. |
| 19. _____ Nested menu | S. | The mouse may have one, two, or three buttons. To _____ means to press one of these buttons. |
| 20. _____ Escape | T. | When two or three buttons on a mouse are pressed at once, it is known as _____. |
| 21. _____ Point | U. | A _____ is simply a list of commands arranged by the programmer in a certain area, usually along the top or bottom of the screen. |
| 22. _____ Dialog boxes | V. | A _____ is a set of menus arranged in a tree structure. |
| 23. _____ Click | W. | _____ are menus that are designed to pop up when their parent command is selected. |
| 24. _____ Graphic interface | X. | _____ are menus that are designed to pop down from the top of the screen when their parent command is selected. |
| 25. _____ Pop-up menus | Y. | _____ are boxes containing choices from which the user can select. |
| 26. _____ Pop-down menus | Z. | When the Macintosh Plus was introduced, it contained a _____ which made its operations much simpler. |

PRACTICING TOUCH-TYPING

Project 1

INSTRUCTIONS: Using appropriate touch-typing software and typing exercises provided by your teacher, enter data for the typing exercises, maintaining a satisfactory level of accuracy. Make sure that you feel confident of every key location. Any keys that you have difficulty remembering, complete additional exercises on those specific keys. Remember to keep your eyes on the screen.

Project 2

INSTRUCTIONS: Using software and exercises provided by your teacher, enter text for at least five documents, maintaining a satisfactory level of accuracy.

Project 3

INSTRUCTIONS: Using ten-key by touch data entry software provided by your teacher, complete at least three exercises maintaining a satisfactory level of accuracy.

IMPROVING SPEED AND ACCURACY

INSTRUCTIONS: Using typing skill-building software, repeat the drills until you have increased your words per minute at least ten words and until you consistently maintain an accuracy level of at least 95%. Use the Skill Building Chart to record your progress.

MANIPULATING DATA WITH A MOUSE

Project 1

INSTRUCTIONS: Collect five (5) pictures from advertisements in computer magazines that show examples of menus and dialog boxes. Mount them neatly so that they may be displayed in your classroom.

Project 2

INSTRUCTIONS: If a mouse is available in the school computer lab, complete several exercises using it with software programs provided by your teacher. If a mouse is not available on campus, visit a local computer store to see a mouse in operation.

COMPETENCY TEST

1. Describe the differences and similarities between the computer and the electronic keyboard.
2. List the eight keys that are in the home position on the alphabetic keyboard.
3. Finish this diagram showing the location of the numbers on the numeric key pad on a computer keyboard.

— — —
— — —
— — —

4. The top-row numbers on the alphabetic keyboard also serve as _____ marks when the shift key is depressed.
5. The _____ key enables the entry of numbers on the numeric key pad.
6. When the NumLock key is not depressed, the keys perform _____ movement control functions.
7. LED stands for _____.
8. _____ keys move the cursor one space in any of the four directions. If the *ScrollLock* is depressed, these keys move the *document* one space in any direction.
9. _____ moves the document *up* on the page (screen).
10. _____ moves the document *down* on the page (screen).
11. _____ moves the cursor to the upper left space on the screen.
12. _____ moves the cursor to the lower left space on the screen.
13. _____ moves the cursor back one space, deleting the character which occupied that space.
14. _____ is the same key normally thought of as a return key on a typewriter. On a computer, it is used to tell the computer to process whatever instruction was just typed.
15. _____ is used to get out of certain programs or menu structures.
16. _____ changes the functions of the cursor movement keys (arrows, etc.) from moving the cursor to moving the document within the screen window.

BCAI/Data Processing /Data Entry Procedures/COMPETENCY TEST (Continued)

17. _____ prints the screen when depressed (may not work on some application programs).
18. _____ can be used to take out screen characters that are highlighted by the cursor.
19. _____ can be used to put in characters from the scrap.
20. _____ keys are 10 or 12 keys that can be assigned functions by the software application program.
21. System _____ keys are sometimes used in combination with other keys to allow other keys to perform more than one function. Examples are CTRL, ALT, and ESC.
22. The ability to enter _____ on the numeric key pad by touch is very important for spreadsheets and calculations.
23. Describe the importance of speedy data entry on a computer.
24. Describe the importance of accurate data entry on a computer.
25. List three advantages of using a mouse rather than using standard keyboard entry procedures.
 - 1.
 - 2.
 - 3.

BCAI/Data Processing /Data Entry Procedures/COMPETENCY TEST (Continued)

26. What is a mouse?
27. Operating a mouse is one of the simplest concepts in learning to operate a computer. It can be summed up by two words: _____ and _____.
28. To _____ means to move the mouse until it points to whatever option or command you want to enter.
29. The mouse may have one, two, or three buttons. The use of these buttons corresponds to the enter key used on a keyboard. To _____ means to press one of these buttons.
30. Define chording.
31. On-screen commands are chosen from a _____.
32. A menu set up in a tree structure is known as a _____ menu.
33. Many newer programs contain _____ boxes. These are boxes containing choices from which the user can select. The operation of the program is greatly simplified and made easier. The user simply points and clicks.

COMPETENCY CHECKLIST

ESSENTIAL ELEMENT: 75.87(e)(1)(D)(E)

The students will be provided opportunities to: demonstrate the ability to enter, manipulate, and retrieve data on a computer terminal; and understand concepts of networked and multi-user configuration.

OBJECTIVE: Students will use the touch system of keyboarding, will build greater speed and accuracy in keyboarding, and will understand the advantages of keyboarding skills for computer users.

	MASTERY	NON MASTERY
1. Identify and correctly use the additional keys on a computer keyboard.	_____	_____
2. Demonstrate correct finger use for touch typing.	_____	_____
3. Type with increased speed and accuracy.	_____	_____
4. Describe the advantages of using a mouse in moving around the keyboard.	_____	_____
	_____	_____
	_____	_____
	_____	_____

STUDENT NAME _____

SECTION II
INFORMATION PROCESSING

ESSENTIAL ELEMENT

75.87 (e)(2)

Concepts and skills related to information processing.

The student will be provided opportunities to:

- A. demonstrate basic information processing concepts; and
- B. apply the general capabilities of information processing tools and software.

SUGGESTED UNIT LESSON PLAN

SECTION II: INFORMATION PROCESSING

UNIT I: CONCEPTS OF INFORMATION PROCESSING

**ESSENTIAL 75.87
ELEMENT: (e)(2)(A)**

**ALLOCATED
TIME: 10 Hours**

UNIT OBJECTIVE: Students will demonstrate basic information processing concepts.

**STUDENT
OBJECTIVES:**

Upon completion of this unit, the student will be able to:

1. Explain and demonstrate basic information processing terminology
2. Explain the purpose of computerized information processing and identify applications for its use in business, industry, government, and education
3. Identify and explain the function of each equipment component within the information processing system
4. Identify two types of storage devices within the information processing system
5. Demonstrate the use of each equipment component within the information processing system

FOCUS: The applications for information processing are almost endless. The ease with which one can draft and revise memos, letters, reports, and other documents with information processing increases both the speed and quality of one's writing.

DOMAINS: Activities and competency tests have been designed to provide learning experiences utilizing the affective, cognitive, and/or psychomotor domains.

BASIC SKILLS: Activities and competency tests have been designed to reinforce the basic skills of reading, and/or mathematics.

CONTENT OUTLINE

- I. Defining information processing
- II. Historical development
 - A. Use of symbols
 - B. The Chinese
 - C. Johann Gutenberg
 - D. First typewriter
 - E. Automatic typewriter
 - F. Dedicated word processing
 - G. Microcomputer
- III. Information processing applications
 - A. Memos, letters, and reports
 - B. Form documents
 - C. Electronic mail
 - D. Text
 - E. Mathematics and algebraic equations.
- IV. Integrated information processing
- V. Components of information processing equipment
 - A. Computers
 - B. Input devices
 - C. Output devices
 - D. Auxiliary storage
- VI. Storage components
 - A. Floppy disk
 - B. Hard Disk
- VII. Basic features of information processing
 - A. Modifications
 - B. Screen
 - C. Keys
 - D. Word wrap
- VIII. Steps involved in the information processing cycle
 - A. Loading the software program
 - B. Opening a new document file
 - C. Creating a document
 - D. Editing a document
 - E. Formatting a document
 - F. Managing files, including saving and retrieving documents
 - G. Printing documents
 - H. Clearing the screen or quitting the program

SUGGESTED TEACHER ACTIVITIES

General Teacher Preparation

1. Preview the unit and review objectives.
2. Decide on a variety of instructional methods to present the unit.
3. Prepare questioning techniques and closure statements.
4. Make modifications in curriculum for special needs students.
5. Consult several alternative sources to enhance and update your knowledge of the current trends, issues, and processes related to the unit content.
6. Select exercises, drills, and other resources to use as supplemental materials for the unit.
7. Secure and prepare sufficient quantities of software backup diskettes for student use.
8. When appropriate, take a field trip or have a guest speaker present a portion of the unit describing industry standards.
9. Prepare appropriate bulletin boards and transparencies.
10. Make copies of appropriate handouts, activities, and test materials.
11. Secure overhead projector, LCD computer panel for data projection, and an appropriate screen.

General Classroom Preparations

1. Secure the students' attention.
2. Communicate learning expectations--goals to be accomplished.
3. Emphasize the value/importance of the unit content or activity.
4. Relate unit content to prior or future learning.
 - a. Use discussions and pretests to determine prior knowledge of the unit content.
 - b. From the results of the discussions and pretests, modify your teaching plans to fit student needs.
 - c. Use enthusiasm, and relate the content to the student's interests.

Reteach Activities

1. Use a new method to reteach a unit activity.
2. Using additional resources, create individualized materials for the more and less capable students.
3. Utilize those sections of tests which need additional reinforcement.
4. Utilize unit activities not previously used.
5. Use peer practice for the reteaching of terminology--one student asks about the meaning of a word. The other student has the list of answers (words). Hints will be given until the word is matched with its correct definition.

Specific Teaching Activities

1. Produce transparencies illustrating the features of the software to be used.
2. Set up a visit to a school office or local business where students can observe the "life" of a document, from input to storage and retrieval.
3. Discuss the function keys that are specific to your word processing software program.
4. Use a flow chart to illustrate the path of a document as it proceeds through the processing cycle.

Activity One

Project 2

Materials Needed: 1 sheet of typing paper per student
Pencils
Computer terms

Give each student one sheet of paper.

Have students draw five vertical lines down the 11" side of the paper.

Have students draw four vertical lines down the 8 1/2" side of the paper. 20 squares should result.

Designate the second square on the third row as a free space.

Write a list of terms on the board. Have students select terms at random and place one term in each square on their paper.

HOW TO PLAY

Reads definition for one of the terms.

The students who have the term being defined on their card mark an X on that space on their card.

The student who finds all terms on his/her card wins first.

NOTE: This game can be used with any section or combination of sections in this unit to aid in teaching and reviewing new material.

Activity Two

Project 2

Make arrangements for students to visit and observe businesses that are using information processing.

Activity Five

Project 1 Provide students with documentation for the software program so they can look up the specific commands.

Projects 2 - 3 Examine exercises to see if any additional modifications need to be made.

Competency Test

Project 4 Examine to see if any modifications need to be made.

ANSWERS TO ACTIVITIES

Activity One

Project 1

- | | | | |
|-----------------|-----------------|--------------|-----------------|
| 1. pitch | 8. center | 15. editing | 22. paste |
| 2. proportional | 9. tab | 16. typeover | 23. highlight |
| 3. spacing | 10. indent | 17. inserted | 24. hyphenating |
| 4. justify | 11. hanging | 18. move | 25. widows |
| 5. margins | 12. indentation | 19. line | 26. orphans |
| 6. header | 13. formatting | 20. cut | 27. page |
| 7. footer | 14. ruler | 21. and | 28. breaks |

Project 2 Evaluated to the satisfaction of the instructor.

Activity Two

Purpose--computerized information processing documents are created, revised, stored, retrieved, and printed.

Business/industry--memos, letters, reports, and sales letters

Government--contracts, letters, reports, and memos

Education--lesson plans, research papers, compositions, and reports

Project 2 Evaluated to the satisfaction of the instructor.

Activity Three

Project 1

1. Computer--the CPU
2. Input devices--device for entering data
3. Output devices--device to display document
4. Auxiliary storage--disk used to store the document for later use

Project 2 Evaluated to the satisfaction of the instructor.

Activity Five Evaluated to the satisfaction of the instructor.

COMPETENCY TEST ANSWERS

Project 1

1. A duplicate file.
2. A single digit, character, or space.
3. An instruction given to the computer when you press a specific key.
4. A list of the file names located on the disk.
5. Magnetic medium for recording (storing) information.
6. A unit of storage for information (text, data, or programs) on the disk, identified by a unique name.
7. The way information is arranged on the screen or the page, using margin, centering, and other printing features.
8. Written, typed, or printed copy; a document.
9. Entering characters into the memory of a word processor.
10. Transfer program or file into computer memory.
11. Reading copy to find and mark errors for corrections.
12. Command to write the document or program onto the disk.
13. Moving a portion of the text on the screen into view.
14. A command key that turns a feature on or off. For example, the "caps lock" key can be used to switch between upper and lower case letters.
15. A feature that sends text to the beginning of the next line when you type beyond the margin.

Project 2

1. Computer--the CPU and memory
Input devices--device for entering data
Output devices--device to display document
Auxilliary storage--disk used to store the document for later uses.
2. Floppy disk and hard disk
3. The purpose of computerized information processing documents are to create, revise, store, retrieve, and print.
Business/industry--memos, letters, reports, and sales letters
Government--contracts, letters, reports, and memos
Education--lesson plans, research papers, compositions, and reports

Project 3

- | | |
|-----------------|------------------|
| 1. character | 7. backup |
| 2. directory | 8. command |
| 3. file | 9. toggle switch |
| 4. keyboarding | 10. save |
| 5. load | 11. word wrap |
| 6. proofreading | 12. disk |

Project 4

- Document to be evaluated to the satisfaction of the instructor.

SUGGESTED UNIT LESSON PLAN

SECTION II: INFORMATION PROCESSING

UNIT II: INFORMATION PROCESSING APPLICATIONS

**ESSENTIAL 75.87
ELEMENT: (e)(2)(B)**

**ALLOCATED
TIME: 25 Hours**

UNIT OBJECTIVE: Students will be able to apply the capabilities and features of information processing to produce a document.

**STUDENT
OBJECTIVES:**

Upon completion of this unit, the student will be able to:

1. Outline and explain the steps in the document cycle
2. Explain and demonstrate the formatting feature of an information processing software package
3. Explain and demonstrate the editing feature of an information processing software package
4. Explain and demonstrate the locating feature of an information processing software package
5. Explain and demonstrate the searching feature of an information processing software package
6. Demonstrate the steps in the document cycle
7. Demonstrate the use of the information processing software to produce a report, memo, and letter.

FOCUS: In the information processing system, one needs to understand the difference between writing on a word processor and using a typewriter. When one is familiar with, and has had some practice with the features and commands of the software, he/she is in a position to use the program for document production.

DOMAINS: Activities and competency tests have been designed to provide learning experiences utilizing the affective, cognitive, and/or psychomotor domains.

BASIC SKILLS: Activities and competency tests have been designed to reinforce the basic skills of reading, writing, and/or mathematics.

CONTENT OUTLINE

- I. Five steps of the document cycle
 - A. Origination
 - B. Processing
 - C. The text is edited (proofread/errors corrected)
 - D. Saving the document
 - E. Distribution or communication of the information
- II. Functions of information processing software
 - A. Help
 - B. Formatting
 - 1. Margins
 - 2. Tab stops
 - 3. Paragraph indents
 - 4. Character formats
 - C. Entering and editing
 - 1. Insert and replace (typeover) mode
 - 2. Deleting
 - 3. Reformatting
 - 4. Line spacing
 - 5. Block operations
 - 6. Moving or cut/paste
 - 7. Copy
 - 8. Search and replace
 - D. Printing
 - 1. Top and bottom margins
 - 2. Right-justification
 - 3. Headers and footers
 - 4. Page number
 - 5. Pitch
 - 6. Page breaks
 - 7. Merge-printing
 - E. Advanced features
 - 1. Split screen
 - 2. Column mode
 - 3. Speller
 - 4. Thesauruses
 - 5. Outlines
 - 6. Macros
 - 7. Windows
 - 8. Style checkers
 - 9. Math/calculator
 - 10. Automatic file backup
 - 11. Automatic saving

SUGGESTED TEACHER ACTIVITIES

General Teacher Preparations

1. Preview the unit and review objectives.
2. Decide on a variety of instructional methods to present the unit.
3. Prepare questioning techniques and closure statements.
4. Make modifications in curriculum for special needs students.
5. Consult several alternative sources to enhance and update your knowledge of the current trends, issues, and processes related to the unit content.
6. Select exercises, drills, and other resources to use as supplemental materials for the unit.
7. Secure and prepare sufficient quantities of software backup diskettes for student use.
8. When appropriate, take a field trip or have a guest speaker present a portion of the unit describing industry standards.
9. Prepare appropriate bulletin boards and transparencies.
10. Make copies of appropriate handouts, activities, and test materials.
11. Secure overhead projector, LCD computer panel for data projection, and an appropriate screen.

General Classroom Preparations

1. Secure the students' attention.
2. Communicate learning expectations--goal(s) to be accomplished.
3. Emphasize the value/importance of the unit content or activity.
4. Relate unit content to prior or future learning.
 - a. Use discussions and pretests to determine prior knowledge of the unit content.
 - b. From the results of the discussions and pretests, modify your teaching plans to fit student needs.
 - c. Use enthusiasm, and relate the content to the student's interests.

Reteach Activities

1. Use a new method to reteach a unit activity.
2. Using additional resources, create individualized materials for the more and less capable students.
3. Utilize those sections of tests which need additional reinforcement.
4. Utilize unit activities not previously used.
5. Use peer practice for the reteaching of terminology--one student asks about the meaning of a word. The other student has the list of answers (words). Hints will be given until the word is matched with its correct definition.

Specific Teaching Activities

1. In all projects which require the student to key a document, the student should be able to independently load the system and software being used in the class. The document should be error-free and in correct form. The student should be able to proofread, correct, save, and print a hard copy.
2. Develop a wallchart or handouts of the commands and options for the software.
3. Assemble samples of different categories of documents that might have been produced by a word processor. These can be displayed in the classroom.
4. Duplicate worksheets on types of documents and word processing features.
5. Prepare transparencies to use with lecture and discussion, outlining the procedures that will be used.
6. For each activity, go over the appropriate instructions specific to your computer and word processing software requirements.
7. Make available a hands-on tutorial for individual instruction in the use of the software.
8. Arrange a competition among individuals or teams to produce assigned documents correctly, in the shortest time.

Activities Two - Five

- Project 2 Documents and instruction sheet need to be provided for students to practice inputting and performing formatting changes.

Activity Six

- Project 3 May need to assist students in composing a letter. Give your OK on the handwritten letter before it is keyed.

Activity Seven

- Project 1 Furnish documents to be keyed and provide instructions for preparation.

ANSWERS TO ACTIVITIES

- Activity One**
1. Origination is the process of converting raw facts and data into usable information.
 2. Processing involves converting the information from dictated to hand-written form to finished document.
 3. The text is edited (proofread/errors corrected)
 4. Saving the document involves transferring the document from the temporary memory to permanent storage.
 5. Distribution involves distribution or communication of the information by some means.

Activities Two - Five

Project 1 Answers will vary according to the information processing software and equipment used. Evaluated to the satisfaction of the instructor.

Projects 2-4 Evaluated to the satisfaction of the instructor.

Activities Six - Seven Evaluated to the satisfaction of the instructor.

COMPETENCY TEST ANSWERS

Project 1

1. Five steps of the document cycle
 - a. Origination is the process of converting raw facts and data into usable information.
 - b. Processing involves converting the information from dictated to hand-written form to finished document.
 - c. The text is edited (proofread/errors corrected)
 - d. Saving the document involves transferring the document from the temporary memory to permanent storage.
 - e. Distribution involves distribution or communication of the information by some means.
2.
 - a. Editing is the ability to create text easily and to change it.
 - b. Formatting is the process of changing the left, right, top, and bottom page margins, or changing the line spacing for a part of the document or for an entire document.
 - c. Searching/locating allows for selected changes to be made to all occurrences of a particular character, word, or phrase.

BCAI/Information Processing/Info. Processing Applications/ANSWERS

Project 2

1. Longhand, dictation, composition at the keyboard, and voice processing
2. Three of the following: keyboard, microfilm (CIM), optical character recognition (OCR), and voice-to-terminal
3. Floppy disk and hard disk
4. U.S. Postal Service, courier service, and electronic delivery system
5. Local area networks (LAN)
6. Facsimile equipment
7. Printing
8. Computer-based
9. Voice mail
10. U.S. Postal Service; courier

Project 3

Editing is the ability to create text easily and to change it.

Formatting is the process of changing the left, right, top, and bottom page margins or changing the line spacing for a part of the document or for an entire document.

Searching/locating allows for selected changes to be made to all occurrences of a particular character, word or phrase.

Projects 4-6

Evaluated to the satisfaction of the instructor.

TERMINOLOGY

Application	Use of information processing software, such as in creating letters, reports, and mailing lists.
Backup	A duplicate file.
Block	A selected portion of text which can be operated upon as a unit.
Center	To balance text or headings between margins.
Copy	To reproduce a block within a document or in another document.
Cut and paste	To remove a block from one part of a document and replace it in another location.
Delete	To erase characters from a document and close up the vacated space.
Draft	A rough, unedited copy.
Edit	Any additions, deletions, changes, respacing, or moving of text within a document.
Footer	A line of text repeated at the bottom of each page.
Format	Arrangement on a page, including margins, spacing, type size, tab stops, etc.
Hard copy	Written, typed, or printed copy; a document.
Hanging paragraph	Indenting each line of a paragraph except the first line.
Header (running head)	A line of text which appears at the top of each page.
Hyphenation	A feature which permits dividing words at the end of a line, permitting a more even right margin.
Indent	To enlarge the margin for selected portions of the text.
Insert	To add characters within existing text, and moving the following portions to create the needed space.
Justify	Print with straight margins on both sides.
Margin	The specified amount of space to the left, right, top, and bottom of the text area.
Move	Changing the location of a block of text within a document.
Orphan	The last line of a paragraph which is printed at the top of a page after a page break.

BCAI/Information Processing/TERMINOLOGY

Page break	A manual or automatic command to control when a new page will begin.
Pitch	The measure of type size (characters per inch).
Proportional spacing	A capability of some systems in which space is adjusted according to the character.
Ruler	A guide displayed on the screen by some word processors, to assist in formatting.
Scrolling	Moving a portion of the text on screen into view.
Tab	A preset distance from the left margin to which the cursor can be moved with a single keystroke.
Typeover	A condition in which characters are replaced, rather than inserted, when typed into existing text.
Widow	The first line of a paragraph which is printed at the bottom of a page, before a page break.
Word wrap	A feature that sends text to the beginning of the next line when you type beyond the margin.

TEXT/WORKBOOKS

*APPLEWORKS: INTEGRATED APPLICATIONS
FOR MICROCOMPUTERS*

text-workbook, diskettes
South-Western Publishing Co.

BASIC LETTER AND MEMO WRITING

South-Western Publishing Co.

*COMMUNICATION SKILLS FOR THE
PROCESSING OF WORDS*

text-workbook, tests
South-Western Publishing Co.

*COMMUNICATION SKILLS FOR WORD
PROCESSING*

Harcourt, Brace, and Jovanovich Publishing Co.

*CONSULTAMATION, INC.: WORD PROCESSING
PRACTICE AND APPLICATIONS*

text-workbook, dictation tapes, manual
Gregg/McGraw-Hill

*DEVELOPING CONCEPTS FOR WORD
PROCESSING*

Gregg/McGraw-Hill

DEVELOPING EDITING SKILL

text-workbook, manual
Gregg/McGraw-Hill

DEVELOPING PROOFREADING SKILL

text-workbook, manual
Gregg/McGraw-Hill

EDITED COPY FOR WORD PROCESSING

text-workbook
Dictation Disk Co.

*THE ELECTRONIC OFFICE AND YOU:
WORD PROCESSING CONCEPTS*

text-workbook, manual
Gregg/McGraw-Hill.

*GLENCO WORD PROCESSING: A PRACTICAL
GUIDE TO CONCEPTS AND APPLICATIONS*

text, workbook, manual and key
Glenco Publishing Co.

*INTEGRATED KEYBOARDING/COMMUNICATION
SKILLS*

text-workbook
South-Western Publishing Co.

*INTRODUCTION TO APPLE WRITER
WORD PROCESSING*

text-workbook
South-Western Publishing Co.

INTRODUCTION TO WORD PROCESSING

Bobbs-Merrill Educational Publishers

INTRODUCTION TO WORD PROCESSING

Winthrop Publishers, Inc.

*LEARNING WORD PROCESSING CONCEPTS
USING APPLE WRITER*

text, manual
Gregg/McGraw-Hill

MAILABLE LETTERS

Gregg/McGraw-Hill

*MANAGEMENT OF WORD PROCESSING
OPERATIONS*

The Benjamin/Cummings Publishing Co., Inc.

OFFICE PROCEDURES AND TECHNOLOGY

textbook
Milady Publishing Co.

101 WORD PROCESSING EXERCISES

Gregg/McGraw-Hill

*THE RESEARCH AND REPORT HANDBOOK FOR
BUSINESS, INDUSTRY, AND GOVERNMENT*

John Wiley and Sons, Inc.

*SKILL BUILDING EXERCISES FOR THE
WORD PROCESSOR*

text-workbook
Dictation Disk Co.

TYPEWRITING: A MASTERY APPROACH

Science Research Associates, Inc.

TYPING FROM ROUGH DRAFTS

Milady Publishing Company

WORD PROCESSING
Milliken Publishing Co.

**WORD PROCESSING, A COMPREHENSIVE
TRAINING PROGRAM**
ESP, Inc. Productions

**WORD PROCESSING APPLICATIONS
FOR ELECTRONIC TYPEWRITERS**
text-workbook
Houghton Mifflin

**WORD PROCESSING APPLICATIONS FOR
TEXT EDITORS**
text-workbook
Houghton Mifflin

WORD PROCESSING CONCEPTS
South-Western Publishing Co.

**WORD PROCESSING: OPERATIONS,
APPLICATIONS, AND ADMINISTRATION**
Bobbs-Merrill Educational Publishers

WORD PROCESSING SUPERVISION
text, guide
Bobbs-Merrill Educational Publishers

WORKING YOUR WAY THROUGH WORDSTAR
text-workbook
South-Western Publishing Co.

THE WP BOOK: A REFERENCE MANUAL
John Wiley and Sons

MAGAZINES

ADMINISTRATIVE MANAGEMENT
P.O. Box 13205
Philadelphia, PA 19101

MODERN OFFICE PROCEDURES
P.O. Box 95759
Cleveland, OH 44101

THE OFFICE
Office Publications, Inc.
P.O. Box 13205
Philadelphia, PA 19101

WORD PROCESSING WORLD
Geyer-McAllister Publishers, Inc.
51 Madison Avenue
New York, NY 10010

WORDS
IWP Association
Maryland Road
Willow, Grove, PA 19090

FILMS

**BASIC SKILLS IN WORD PROCESSING:
THE UNIVERSAL APPROACH**
filmstrips, guides and manual
South-Western Publishing Co.

DISTRIBUTION AND RETENTION
11 filmstrips, cassettes, guide
Prentice-Hall Media

GENERATING DOCUMENTS
2 filmstrips, cassettes, guide
Prentice-Hall Media

AN INTRODUCTION TO WORD PROCESSING
3 filmstrips, cassettes, guide
Prentice-Hall Media

INTRODUCTION TO WORD PROCESSING
filmstrip
J. Weston Walsh

KEYBOARDING AND EDITING
4 filmstrips, cassettes, guide
Prentice-Hall Media

**WORD PROCESSING AND THE CHANGING
OFFICE ENVIRONMENT**
student activities and projects, filmstrips
South-Western Publishing Co.

WORD PROCESSING IN ACTION!
sound filmstrips
Glenco Publishing Co.

REFERENCES

ADVANCED WORDPERFECT
Eric Alderman and Lawrence J. Magid
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

DICTIONARY OF WORD PROCESSING
Glencoe Publishing

**DISPLAY WRITE FOUR: THE COMPLETE
REFERENCE**
Gail Todd
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

LESSONS: AN AUTOBIOGRAPHY
Dr. An Wang and Eugene Linden
Addison-Wesley

*MANAGEMENT OF WORD PROCESSING
OPERATIONS*
Paula B. Cecil
The Benjamin/Cummings Publishing Co., Inc.

*MICROSOFT WORD FOR THE MCINTOSH:
THE COMPLETE REFERENCE*
Michael A Fischer
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

*MICROSOFT WORD MADE EASY:
THIRD EDITION*
Paul Hoffman
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

*MICROSOFT WORD: SECRETS,
SOLUTIONS, SHORTCUTS*
Tom Sheldon
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

*MICROSOFT WORD: THE COMPLETE
REFERENCE*
Eric Alderman
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

PFS PROFESSIONAL WRITE
Walter A. Ettlin
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

USING WORDPERFECT FOR THE MACINTOSH
Daniel J. Rosenbaum
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

*WORD/INFORMATION PROCESSING:
CONCEPTS AND APPLICATIONS*
The Charles E. Merrill Publishing Co.

WORDPERFECT 5.0 MADE EASY
Mella Minceberg
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

*WORDPERFECT 5.0: SECRETS,
SOLUTIONS, SHORTCUTS*
Tom Sheldon

Borland, Osborne, and MicroPro
McGraw-Hill Publishers

*WORDPERFECT 5.0: THE
COMPLETE REFERENCE*
Karen L. Acerson
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

WORDPERFECT MADE EASY
Mella Minceberg
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

WORDPERFECT: POWER USERS GUIDE
Ruth Halpern
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

WORDSTAR 4.0 MADE EASY
Walter Ettlin
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

WORDSTAR 4.0 MADE EASY
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

WORDSTAR 5.0 MADE EASY
Walter A. Ettlin
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

SOFTWARE

APPLEWORKS
Apple Computer
Apple IIE, IIC

APPLEWORKS BUDDIES
Career Aids, Inc.

APPLEWRITER/APPLEWRITER II
Apple IIE, IIC

APPLICATIONS USING THE PC
Dr. Nancy Groneman
South-Western Publishing Co.

COMPUTER ASSISTED WRITING
Educational Activities Inc.
Apple II, IIE, IIC 48k
TRS-80
IBM PC; XT, AT, 128k

ELECTRID PENCIL PC

DiskCount Data
IBM PC; XT, AT, 128k

FRIENDLY WRITER

Career Aids
IBM PC, or PCjr 64k

HELPFUL WRITER, FOR BANK STREET WRITER

Career Aids
Apple II, IIE, IIC 64k

IBM ASSISTANT PROGRAM

IBM 128 K

IBM REPORTING ASSISTANT

IBM 128 K

LAZY WRITER WORDPROCESSING SYSTEM

DiskCount Data
TRS-80

LESCRIPT

DiskCount Data
TRS-80

THE LETTER EDITOR

Career Aids
Apple II, IIE, IIC, 48k

MICROSOFT WORD

Microsoft
Apple IIGS, IIE, IIC 48k
Macintosh, Macintosh +
IBM PC; XT, AT, 320k

MICROSOFT WORD: POWER USERS GUIDE

John V. Hedthe
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

MICROTOOLS

South-Western Publishing Co.
Apple IIE, IIC
IBM PC

MULTIMATE ADVANTAGE II

Ashton-Tate
IBM PC; XT, AT, 384k, DOS 2.0-3.2

MULTISCRIBE

Career Aids
Apple II, IIE, IIC, prodos, 48k

PFS: WRITE, PFS: WRITE PROFESSIONAL

Apple IIE, IIC, prodos, 128k
IBM PC or XT 320k

SENSIBLE GRAMMAR

Career Aids
Apple II, IIE, IIC 128k

SENSIBLE SPELLER

Career Aids
Apple II, IIE, IIC 48k, or prodos 128k

SENSIBLE WRITER

Career Aids,
Apple II, IIGS, IIE, IIC 128k

TERM PAPER WRITER

Learning Arts
Apple II, IIE, IIC 48k
IBM PC; XT, AT, 128k

TEXTMERGE

DiskCount Data
TRS-80

WEBSTER'S NEW WORLD SPELLING

CHECKER AND ON LINE THESAURUS
Career Aids
Apple II, IIE, IIC 48k
IBM PC or XT 128k

WORD PERFECT

Raylene Dill
Career
IBM PC/Apple II family

WORD PERFECT

Word Perfect Corp.
Apple II, IIE, IIC, prodos, 64k
IBM PC 256k

WORD PROCESSING ON YOUR

*MICROCOMPUTER: FROM KEYBOARD
TO PRINTOUT*
Vocational Media Associates

WORD PROCESSOR STARTER PACKAGE

Career Aids
Apple II, IIE, IIC 48k

WORDSTAR EXTRA-EASY

Career Aids
Apple II, IIE, IIC 64k
IBM PC 256k

WORDSTAR PROFESSIONAL

Micropro
Apple II, IIE, IIC 64k
IBM PC 192k

THE WRITE APPROACH

Career Aids
Apple II, IIE, IIC 64k
Version I and II available

SECTION II: INFORMATION PROCESSING

UNIT I: CONCEPTS OF INFORMATION PROCESSING

UNIT OBJECTIVE:

Students will demonstrate basic information processing concepts.

STUDENT OBJECTIVES:

Upon completion of this unit, the student will be able to:

1. Explain and demonstrate basic information processing terminology
2. Explain the purpose of computerized information processing and identify applications for its use in business, industry, government, and education
3. Identify and explain the function of each equipment component within the information processing system
4. Identify two types of storage devices within the information processing system
5. Demonstrate the use of each equipment component within the information processing system

GENERALIZATION:

The applications for information processing are almost endless. The ease with which one can draft and revise memos, letters, reports, and other documents with information processing increases both the speed and quality of one's writing.

UNIT OVERVIEW

- I. Information processing involves collecting/creating, recording, manipulating, storing, and printing data to produce useful information. The productivity of the office has increased as a result of computerized procedures and equipment used to create, sort, reproduce, and distribute information.
- II. Historical development
 - A. Humans first used symbols to represent a thought or an idea. These were verbal, so another person had to be present to get the message.
 - B. The Chinese began to use symbols carved out of blocks of wood to produce printed documents on paper in the fifth century.
 - C. Johann Gutenberg developed the movable-type press in the early-to-mid 1400s.
 - D. The first patent for a typewriter was granted in 1714 to Henry Mills; however, the first working model was not produced until 1867 by Christopher Sholes, an American printer. In 1875 the product was finally manufactured and marketed by Remington and Sons.
 - E. The Hooven Company introduced an automatic typewriter in 1918 that recorded keystrokes on an embossed cylinder for later playback.
 - F. Dedicated word processing systems were developed during the late 1960s and the early 1970s. They could be used by only a single person at a time and could perform only a word processing function.
 - G. In the late 1970s, the microcomputer made systems more flexible. They now support multi-users, integrated with other hardware, and perform a variety of functions.
- III. Information processing applications are almost endless, ranging from tasks that can be done on a typewriter to entirely new tasks that are not possible without the power of the computer. In computerized information processing, documents are created, revised, stored, retrieved, and printed.
 - A. Memos, letters, and reports can be entered, edited, revised, saved, and printed in a variety of formats.
 - B. Form documents, such as contracts, sales letters, and collection notices, can be prepared and used many times.
 - C. Electronic mail documents can be prepared for telecommunication via a modem over telephone lines.
 - D. Text that will be published for projects, such as catalogs, advertising circulars, reports, articles, and books, is camera-ready.

- E. Mathematicians, scientists, and engineers use programs which allow the creation of symbols, such as the letters of the Greek alphabet, that are necessary in mathematics and statistics. These programs also allow the easy entry of algebraic equations.
- IV. Integrated information processing combines extensive information processing capability with other functions such as spreadsheet, graphics, and database management. Using the information processing program, the inclusion of numbers and graphs to tables in the text document is more easily accomplished.
- V. Components of information processing equipment
 - A. Computers all have certain basic parts regardless of their size, shape, expense, and level of ability.
 - 1. Central processing unit (CPU)--the "brains" of the computer.
 - 2. Memory--the part of the computer where information is stored. Two types of memory are ROM (read-only memory), which is permanent, and RAM (random access memory), which is changeable and reusable.
 - B. Input devices--The keyboard is the most common input device for entering data. Each keystroke must be converted into electrical signals for the central processing unit. The mouse, joystick, and optical character reader are three additional types of input devices.
 - C. Output devices--accept the electrical signals from the central processing unit. Printers and CRT screens are the two most common types of output devices.
 - D. Auxiliary storage--the secondary or external memory for storing information from the computer for later use. Two forms of secondary storage are floppy disks and hard disks.
- VI. Storage components--The ability to store and retrieve data is an important part of information processing. Two external storage devices used primarily for information processing are:
 - A. Floppy disk--a magnetic medium which resembles a phonograph record, consisting of a disk enclosed within a protective jacket inserted into a diskette drive. Each floppy disk has the storage capability range of approximately 80,000 - 3,000,000 characters
 - B. Hard Disk--a rigid metal platter that allows data to be recorded on the head of the platter and is often permanently fixed with the disk drive.

BCAI/Information Processing/Concepts of Information Processing/UNIT OVERVIEW

- VII. Basic features of information processing
 - A. Users can modify portions of text by:
 - 1. Making corrections without having to retype correct material.
 - 2. Changing left and right margins and tab stops.
 - 3. Copying or moving portions of text.
 - B. The screen indicates the following
 - 1. Text within the document
 - 2. The top and bottom of the page
 - 3. The left and right margins
 - 4. The tab settings
 - 5. The cursor where the next typed character will appear
 - C. Keys
 - 1. Cursor control keys--on the keyboard and allow the user to move the cursor and type anywhere in the text area on the screen.
 - 2. Function keys are used to execute commonly used commands such as underlining and printing.
 - D. Word wrap is a feature which automatically starts a word at the left margin of the next line if there is not enough room on the previous line.
- VIII. Steps involved in the information processing cycle
 - A. Loading the software program
 - B. Opening a new document file
 - C. Creating a document
 - D. Editing a document
 - E. Formatting a document
 - F. Managing files, including saving and retrieving documents
 - G. Printing documents
 - H. Clearing the screen or quitting the program.

Project 1**INFORMATION PROCESSING TERMINOLOGY WORKSHEET**

Before starting to type a document, you will make some decisions about how the results will appear. For example, you might choose the ____ (1) ____, or number of characters per inch the printer will use. If your hardware and software supports it, you may elect to use ____ (2) ____ (3) ____, which adjusts the space occupied by each character, according to its size. You might decide you want to ____ (4) ____ the ____ (5) ____ (space on the sides), by making them straight on both sides. If your document is long, you might want a ____ (6) ____ to appear at the top of each page, or a ____ (7) ____ at the bottom of the page, and you will probably want to ____ (8) ____ the headings between the margins. Sometimes the document has special sections with columns and things, so you will want to ____ (9) ____ in order to make it easier to jump to the right place. Of course you will probably want to ____ (10) ____ at the first line of each paragraph, or do just the opposite to make ____ (11) ____ (12) _____. To help with some of this ____ (13) ____ (arrangements on a page), some software displays a ____ (14) ____ as a guide at the top of the screen.

Once you start typing, being human, you will probably need to do some ____ (15) ____, to correct errors, or make changes. Usually you can insert characters within words, but sometimes you can choose to ____ (16) ____ instead, so that characters are replaced. If extra characters need to be ____ (17) ____ without leaving a space, that can be done too. If you decide you want to ____ (18) ____ a ____ (19) ____ of text from one part of the document to another, you can ____ (20) ____ (21) ____ (22) ____ very conveniently. You can also ____ (23) ____ a block if you need it to appear in more than one place. Word processing programs do many things for you automatically. Some of them even permit dividing of words at the end of a line, by ____ (24) _____. They will keep you from leaving ____ (25) ____ and ____ (26) ____, leaving one line of a paragraph stranded at the top or bottom of a page. Documents that are longer than one page will look good because the ____ (27) ____ (28) ____ feature will control where a new page begins.

Project 2

COMPUTER BINGO

INSTRUCTIONS: Get materials and instructions from your teacher.

IDENTIFY USES OF INFORMATION PROCESSING

Project 1

INSTRUCTIONS: Explain the purpose of computerized information processing and list at least one application for it in each of the categories listed below.

The purpose:

Business/Industry

Government

Education

14.

Project 2

INSTRUCTIONS:

Select a business from the list provided by your teacher. Contact the business and observe the various types of applications they use which are related to information processing.

INFORMATION PROCESSING EQUIPMENT COMPONENTS

Project 1

INSTRUCTIONS: Explain the function of each equipment component within the information processing system.

Project 2

INSTRUCTIONS: Examine current articles and literature for new hardware components that have been introduced during the last six months. Write a one-page paper describing your findings.

STORAGE DEVICES

INSTRUCTIONS: Examine current articles and literature for new storage devices. Write a one-page paper describing your findings.

DEMONSTRATION OF EQUIPMENT USE

Project 1

INSTRUCTIONS: Write the command for your word processing program which will cause the equipment to do the following:

1. Load the operating system
2. Load the information (word) processing program
3. Open a new document
4. Retrieve an existing document
5. Display help
6. Getting out of trouble
7. Moving around the document

To move cursor

one character left

one character right

one line up

one line down

one word left

one word right

BCAI/Information Processing/Concepts of Info. Processing/ACTIVITY FIVE (Continued)

to beginning of line
to end of line
to top of document
to end of document
to top of screen
to bottom of screen
to scroll screen up
to scroll screen down
to scroll screen right
to scroll screen left
to next page
to previous page
to specific page
to next tab stop
to previous tab stop

8. Typeover and insert
9. Enter text
10. Delete
11. Saving files
12. Printing
13. Stopping the printer
14. Printing to a disk
15. Clearing the screen and memory
16. Quitting the program

Project 2

INSTRUCTIONS: Complete the following steps to successfully enter, proofread, save, and exit an information processing document. (Please note that your teacher may make adjustments to the instructions according to your system's requirements.)

STEP 1: Load the operating system diskette into the RAM of the computer.

STEP 2: Load the information processing (word processing) program.

STEP 3: Place a formatted data disk in drive B.

STEP 4: Type the following sentence:

President Kennedy used this quotation in his inauguration address: "Ask not what your country can do for you; ask what you can do for your country."

STEP 5: Proofread your copy.

STEP 6: Save the information onto your formatted data disk in drive B. Use your last name as the file name.

STEP 7: Exit the word processing system.

Project 3

INSTRUCTIONS: Complete the following steps to successfully enter, proofread, save, and exit an information processing document. In addition, complete the steps to retrieve a file, edit, resave the file, create a backup, and print a copy of the file and a copy of the directory.

STEP 1: Load the operating system diskette into the RAM of the computer.

STEP 2: Load the information processing (word processing) program.

STEP 3: Place your formatted data disk in drive B.

STEP 4: Retrieve the file saved under your last name.

STEP 5: Insert the following sentence before the sentence you typed in Project 2.

John Kennedy was elected President of the United States in November 1960 and served three years in office beginning in January 1961.

STEP 6: Proofread your copy.

STEP 7: Save the file under your last name.

STEP 8: Retrieve the file (again).

STEP 9: Create a backup file.

STEP 10: Print a copy of the file.

STEP 11: Print a copy of your directory.

STEP 12: Exit the word processing system.

COMPETENCY TEST

Project 1

INSTRUCTIONS: Define the following information processing terms:

1. Backup
2. Character
3. Command
4. Directory
5. Disk
6. File
7. Format
8. Hard copy
9. Keyboarding
10. Load
11. Proofreading
12. Save
13. Scrolling
14. Toggle switch
15. Word wrap

11

BCAI/Information Processing/Concepts of Info. Processing/COMPETENCY TEST

3. Explain the purpose of computerized information processing and identify four applications:

Purpose:

Applications:

- 1.
- 2.
- 3.
- 4.

Project 3

INSTRUCTIONS: Fill in the blanks.

1. _____ is a single digit, character or space.
2. _____ is a list of the file names located on the disk.
3. _____ is a unit of storage for information (text, data, or programs) on the disk identified by a unique name.
4. _____ is "typing"; entering information by operating a keyboard.
5. _____ is transferring the program or file into computer memory.
6. _____ is reading copy to find and mark errors for correction.
7. _____ is a duplicate file.
8. _____ is an instruction given to the computer when you press a specific key.
9. _____ is a command key that turns a feature on and off, for example, the caps lock key can be used to switch between upper and lower case letters.
10. _____ is a command to write the document or program onto the disk.
11. _____ is a feature that sends text to the beginning of the next line when you type beyond the margin.
12. _____ is a magnetic medium for recording (storing) information.

Project 4

INSTRUCTIONS: Please complete the following project and print a copy to hand in with this assignment.

- STEP 1: Load the operating system diskette into the RAM of the computer.
- STEP 2: Load the information processing (word processing) program.
- STEP 3: Place your formatted data disk in drive B.
- STEP 4: Type the following:

A worker's responsibility involves more than just performing a job. Employers expect workers to work with a positive attitude toward the job and other employees.
- STEP 5: Proofread your copy.
- STEP 6: Save the information onto your formatted data disk in drive B. You can select the file name.
- STEP 7: Print a copy.
- STEP 8: Exit the word processing system.
- STEP 9: Retrieve your file and edit it. Add the following line:

They expect you to do a full day's work for a full day's pay.
- STEP 10: Resave your document.
- STEP 11: Print a copy.
- STEP 12: Exit the word processing system.

COMPETENCY CHECKLIST

ESSENTIAL ELEMENT: 75.87(e)(2)(A)

The students will be provided opportunities to: demonstrate basic information processing concepts.

OBJECTIVE: Students will demonstrate basic information processing concepts.

MASTERY

NON
MASTERY

1. Explain and demonstrate basic information processing terminology.
2. Explain the purpose of computerized information processing and identify applications for its use in business, industry, government, and education.
3. Identify and explain the function of each equipment component within the information processing system.
4. Identify two types of storage devices within the information processing system.
5. Demonstrate the use of each equipment component within the information processing system.

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

STUDENT NAME _____

SECTION II: INFORMATION PROCESSING

UNIT II: INFORMATION PROCESSING APPLICATIONS

UNIT OBJECTIVE:

Students will be able to apply the capabilities and features of information processing to produce a document.

STUDENT OBJECTIVES:

Upon completion of this unit, the student will be able to:

1. Outline and explain the steps in the document cycle
2. Explain and demonstrate the formatting feature of an information processing software package
3. Explain and demonstrate the editing feature of an information processing software package
4. Explain and demonstrate the locating feature of an information processing software package
5. Explain and demonstrate the searching feature of an information processing software package
6. Demonstrate the steps in the document cycle
7. Demonstrate the use of the information processing software to produce a report, memo, and letter.

GENERALIZATION:

In the information processing system, one needs to understand the difference between writing on a word processor and using a typewriter. When one is familiar with, and has had some practice with the features and commands of the software, he/she is in a position to use the program for document production.

UNIT OVERVIEW

- I. Five steps of the document cycle are:
 - A. Origination is the process of converting raw facts and data into usable information.
 1. Relaying this information may be done by a variety of methods.
 - a. Longhand is the most popular method; however, it is also the slowest.
 - b. Dictation--either shorthand or machine
 - c. Composition at the keyboard
 - d. Voice processing, which converts human voice to electronic data, is still in the developmental stages.
 2. The originator or author should consider the need to generate documents.
 - a. The cost of producing the document
 - b. Deciding whether the document is really necessary
 - c. Deciding the best method of communicating the idea.
 - B. Processing involves converting the information from dictated to hand-written form to finished document.
 1. The operator reviews the original copy and selects appropriate style and format.
 2. The document is entered into the computer memory usually by means of a keyboard, however, other input methods are available.
 - a. Computer input from microfilm (CIM)
 - b. Optical character recognition (OCR)
 - c. Voice-to-terminal input
 - C. The text is edited (proofread/errors corrected). Additional text may be inserted or deleted. When the text is too large to be reviewed on a single screen, the scrolling feature allows for a part of the document to be brought into view for editing.
 - D. Saving the document involves transferring the document from the temporary memory (RAM) of the computer to permanent storage (floppy disk, hard disk).

BCAI/Information Processing/Info. Processing Applications/UNIT OVERVIEW

- E. Distribution or communication of the information is the final step in the document cycle.
1. The U. S. Postal Service is by far the most common method of distribution.
 2. Courier services provide fast delivery of letters and/or small packages.
 3. Electronic delivery systems are becoming more popular.
 - a. Telex, TWX, and mailgrams are Western Union systems which use telecommunication lines to transmit information within the U. S. and to foreign countries.
 - b. Facsimile equipment transmits data of any type, including signatures and pictures.
 - c. Communicating word processors can send information electronically from one terminal to another.
 - d. Computer-based messages (CBMS) are software packages which facilitate text communication among compatible terminals.
 - e. Voice mail systems are similar to CBMS, except the input method is the human voice.
 - f. Local area networks (LAN) permit communication over a short distance, within a building for example.
 - g. Audio communications include traditional person-to-person telephone calls and teleconferences for three or more participants.
 4. Printing the document involves producing a hard copy/copies. Printing may be done on:
 - a. Letter quality or draft copy equipment.
 - b. Impact or non-impact equipment.
 5. Copies may be made by:
 - a. Printing multiple copies on the printer.
 - b. Carbon or NCR paper.
 - c. Photocopy machines.
 - d. Printing machines such as offset, mimeograph, or phototypeset.
 - e. Facsimile machines to send copies to another location.

II. Functions of information processing software

- A. Help--this function supports your use of the software package. If you get "stuck" or you do not know what to do next, you ask for on-screen help.
 - 1. Most commercially produced software has some form of help function.
 - 2. Depending on the software, help may be made available by topic, function, or level.
 - 3. Some software provide help through their basic structure because they are menu-driven or command driven.
- B. Formatting--the first piece of information your system needs to format is your text. Formatting is the process of changing the left, right, top, and bottom page margins, or changing the line spacing for a part of the document or for an entire document. There are several options in the different software packages.
 - 1. Margins--left and right margins can be set for the entire document or paragraph by paragraph. You may want to use the default settings of the system.
 - 2. Tab stops--used to indent text and align tables and lists. Some programs allow you to set tabs anywhere; others have limits. Decimal tabs are used to align decimal points in columns of numbers. Flush-right tabs allow you to align text flush right instead of the usual flush left.
 - 3. Paragraph indents--paragraphs can be formatted so that the first line is indented from the rest of the paragraph. Also, the paragraph can be formatted so that all lines are indented from the left margin or from the left and right margin.
 - 4. Character formats--include boldface, centered, doublestrike, italic, underline, double underline, subscripts, superscripts, and strikethrough. These can be used in combinations and assigned to a character, word, paragraph, block, or entire document.
- C. Entering and editing--the advantage of information processing is its ability to create text easily and to change it. The following are some of the options software packages contain.
 - 1. Insert and replace (typeover) mode--adding text to existing documents. When the insert mode is used, characters to the right of new text move to make room for it. When replace (typeover) mode is used, the text does not move and the new text replaces the old.
 - 2. Deleting--remove unwanted text from existing document.
 - 3. Reformatting--when text is inserted or deleted in existing text, some programs automatically reformat the text to realign it with the margins; others require a command.

4. Line spacing--allows the user to specify the type of spacing (single or double) between lines.
 5. Block operations--selecting a section of text and performing another function on that section. For example, you can delete, center, underline, boldface, or copy a block.
 6. Moving or cut/paste--when words, sentences, paragraphs, and entire pages of text are correct, but are in the wrong order. Identify how much text is to be moved ("cut and lift") from its present location and insert ("paste") into the new location. The program automatically adjusts the surrounding text to make room for the new block of text. Many software programs can move blocks of text directly from one file to a new file.
 7. Copy--similar to a cut-and-paste operation. However, with the copy operation the original version of the text is not affected by the operations. Identify how much text is to be copied, then move to the new location and insert the copied text.
 8. Search and replace--search makes it easy to locate specific text. Replace is often coupled with the search function. The search and replace feature allows for selected changes to be made to all occurrences of a particular character, word, or phrase. The computer searches through the document character by character to find the selected text.
- D. Printing--a means of displaying what is on the screen to the printer. There are a number of ways to format the page.
1. Top and bottom margins--can be set for the entire document or each page.
 2. Right-justification--equal spaces are added between the words in order that the right margin is even.
 3. Headers and footers--printed at the top and bottom of the page. When dealing with a multiple-page report, special information may be desired at the top and/or bottom of each page. This can be entered once and then copied automatically onto each page.
 4. Page number--some programs will allow the operator to print page numbers on multipage documents. There are several options for their location, such as top or bottom of the page, left, right, center, on odd pages, or on even pages.
 5. Pitch--some programs permit the printer's pitch to be changed as a document is being printed.
 6. Page breaks--the user can control where page breaks occur. Ideally, page breaks should be displayed on the screen.

7. Merge-printing--used to print many copies of a form document with data integrated from another source, manually, or a file.
- E. Advanced features--there are several features that are not supported by all software; however, the following features are worth noting:
1. Split screen--allows the display of two sections of the same file or separate files on the screen at the same time, so they can be compared, moved, or copied.
 2. Column mode--allows work with columns. The number of columns will vary on software. A few programs permit creating text on the screen in one column and then printing it out in two or more columns.
 3. Speller--used to find and correct misspellings. Some run from within the program while others are separate packages.
 4. Thesauruses--used to suggest synonyms for a selected word.
 5. Outlines--allows for the creation of an outline as use for text entry, editing, and organization.
 6. Macros--used to record and then manipulate a series of recorded keystrokes.
 7. Windows--two or more documents can be displayed on the screen at the same time.
 8. Style-checkers--check text for style and usage.
 9. Math/calculator--a few programs have the capability to make calculations for the operator.
 10. Automatic file backup--the most recent version is saved in the original file, and the previously saved version will be moved to a backup file where it can be retrieved if necessary.
 11. Automatic saving--of new or revised documents prevents losing files unintentionally when the user quits the program.

STEPS IN THE DOCUMENT CYCLE

INSTRUCTIONS: Outline and explain the steps in the document cycle.

Originating:

Processing

Editing

Saving

Distributing

FORMATTING, EDITING, LOCATING, AND SEARCHING FEATURES

Project 1

INSTRUCTIONS: Write the command for your information processing software and computer system which will cause the equipment to do the following formatting:

1. Reformatting paragraphs (may be automatic)

2. Setting text tab stops

3. Setting decimal tab stops

4. Deleting tab stops

5. Using search

6. Using replace

7. Displaying hidden characters

8. Selecting a block of text

9. Copying a selected block

10. Moving a selected block

11. Deleting a selected block

Project 2

INSTRUCTIONS: Complete the following steps to successfully format, edit, and search a document.

- STEP 1 Load the operating system into the RAM of the memory.
- STEP 2 Load the word processing system into the RAM of the memory and insert a formatted disk in drive B.
- STEP 3 Input the following sentences (single spacing between the lines):
- A worker's responsibility involves more than just performing a job. Employers expect workers to work with a positive attitude toward the job and other employees.
- STEP 4 Format the report changing the spacing to double space and margins to one inch on the left and right.
- STEP 5 Edit the sentences, proofreading for all mistakes.
- STEP 6 Search the sentences to locate the word, "worker's" and replace it with the word, "employee's."
- STEP 7 Delete "and other employees" in the second sentence.
- STEP 8 Save the sentences.
- STEP 9 Print one copy.
- STEP 10 Print out your directory.
- STEP 11 Exit the word processing system.

BCAI/Information Processing/Info. Processing Applications/ACTIVITIES TWO - FIVE (Continued)

12. Writing a block from a document to its own file
13. Reading a file from disk into a document on the screen using window
14. Changing the left margin
15. Changing the right margin
16. Changing the top margin
17. Changing the bottom margin
18. Adding headers
19. Adding footers
20. Centering text between left and right margin
21. Centering text between top and bottom margin
22. Justifying text
23. Changing the line spacing for the entire document
24. Indenting paragraphs

BCAI/Information Processing/Info. Processing Applications/ACTIVITIES TWO - FIVE (Continued)

25. Using hanging indents
26. Boldfacing characters
27. Underlining characters
28. Controlling page breaks
29. Changing lines per page
30. To invoke the speller
31. To create columns
32. Create macros
33. Invoke a macro
34. Set up a form document for merging
35. Set up a file to merge into a form document

Project 3

INSTRUCTIONS: Complete the following steps to successfully format, edit, and search a document.

STEP 1 Load the operating system into the RAM of the computer.

STEP 2 Load the word processing software and formatted disk in drive B.

STEP 3 Input the following outline:

IV. WHAT EMPLOYERS MAY EXPECT FROM EMPLOYEES

- A. Cooperation--Involves sharing tasks when appropriate.
- B. Honesty--Most employees are truthful with their employers.
- C. Initiative--An employee should always show interest in developing new job skills.
- D. Willingness to learn--It is to the employee's advantage to learn everything possible about his/her job.
- E. Willingness to follow directions--An employee should try to follow directions exactly.
- F. Dependability--A dependable employee is one whom an employer can expect to be on the job daily and on time.
- G. Enthusiasm--The best employees like their jobs and show a sincere interest in job performance.

STEP 4 Format the outline setting the margins to one inch on the left and right.

STEP 5 Edit the report, proofreading for all mistakes.

STEP 6 Save the outline onto the formatted data disk.

STEP 7 Print two copies of the outline.

STEP 8 Print the directory.

STEP 9 Exit the word processing system.

Project 4

INSTRUCTIONS: Enter the basic word processing document provided by your teacher. Using the instruction sheet, format, edit, locate, and make replacements as required. Print a copy of the document after each step has been completed.

DEMONSTRATE THE USE OF THE STEPS IN THE DOCUMENT CYCLE

Project 1

INSTRUCTIONS: Complete the following steps to demonstrate your ability to follow the steps in the document cycle.

- STEP 1 Compose (in longhand) letter of application to an employer who has advertised a job listing in the newspaper.
- STEP 2 Load the operating system software into the RAM of the computer.
- STEP 3 Load the word processing software into the RAM of the computer and a formatted data disk.
- STEP 4 Input the letter using full-block style.
- STEP 5 Format the letter using margins of 1 1/2 inches on the left and 1 inch on the right.
- STEP 6 Edit the letter, proofreading for all mistakes.
- STEP 7 Save the letter.
- STEP 8 Print two copies of the letter.
- STEP 9 Address the envelope for mailing.
- STEP 10 Return the letter and envelope to your teacher.
- STEP 11 Print out your directory.
- STEP 12 Exit the word processing system.

Project 2

INSTRUCTIONS: Complete the following steps to demonstrate your ability to follow the steps in the document cycle.

- STEP 1 Load the operating system software into the RAM of the computer.
- STEP 2 Load the word processing software into the RAM of the computer and your data disk (with your file for Project 1).
- STEP 3 Load the letter completed in Project 1.
- STEP 4 Change the format of style of the letter to semi block following instructions from your teacher.
- STEP 5 Change your left margin to one inch.
- STEP 6 Edit the memo, proofreading for all mistakes.
- STEP 7 Load the spelling verification package, and request the computer to check the spelling of text in this document.
- STEP 8 Save the memo.
- STEP 9 Print one copy of the memo.
- STEP 10 Return the copy of the memo to your teacher.
- STEP 11 Print your directory.
- STEP 12 Exit the word processing system.

Project 3

INSTRUCTIONS: Handwrite a letter to a customer to explain that the Flower Sewing Kit that was ordered was so popular that the supply is exhausted and there will be a delay in shipping. Key the letter, proofread, correct, save, print a hard copy, prepare an envelope, and place in the out basket.

DOCUMENT PRODUCTION USING INFORMATION PROCESSING TECHNIQUES

Project 1

INSTRUCTIONS: Prepare a letter using the instructions provided by your teacher. Make sure you proofread the document before handing it to your teacher.

Project 2

INSTRUCTIONS: Write a memo to your teacher requesting that you be excused from class tomorrow. Proofread, correct, save, print a hard copy, and distribute.

Project 3

INSTRUCTIONS: Using current articles, write a one-page double spaced report about new word processing programs and/or features.

COMPETENCY TEST

Project 1

- STEP 1 Load the operating system into the RAM of the computer.
- STEP 2 Load the word processing software and formatted disk in drive B.
- STEP 3 Key in your answers to this test by responding to the following questions.

1. Name and explain the five steps in the document cycle.
 - a.
 - b.
 - c.
 - d.
 - e.
2. Explain the purpose of the editing feature, the formatting feature, and the searching/locating feature.

BCAI/Information Processing/Information Processing Applications/COMPETENCY TEST
(Continued)

Project 2

SHORT ANSWERS

1. _____, _____, and _____ are three methods of originating a document.
2. _____, _____, and _____ are three ways of entering data into memory of the computer.
3. _____ and _____ are two types of storage devices.
4. _____, _____, and _____ are three ways documents can be distributed.
5. _____ permits communication over a short distance (example, within a building).
6. _____ transmits data of any type including signatures and pictures.
7. _____ feature allows a part of the document to be brought into view for editing.
8. _____ message systems are software packages which facilitate text communication among compatible terminals.
9. _____ systems are similar to CBMS except the input method is the human voice.
10. _____ is by far the most common method of distributing a document; however, _____ services provide fast delivery of letters and small packages.

- STEP 4 Reformat the outline, setting the margins to 1 1/2 inches on the left and 1 inch on the right.
- STEP 5 Edit your responses, proofreading for all mistakes.
- STEP 6 Save your responses onto the formatted data disk. Label the file with your last name followed by 1.
- STEP 7 Exit the word processing system.
- STEP 8 Give your disk to your instructor.

Project 3

INSTRUCTIONS: Explain the purpose of the following features.

Editing

Formatting

Searching/locating

Project 4

INSTRUCTIONS: You are the chairperson of the board and you need to write a letter to another board member, Mr. Lynn Hooper, advising him of the meeting at 9:30 a.m. next Thursday. Also, tell him you are considering opening another branch office in his city and this will be discussed at the meeting. Request that he conduct research for you. Proofread, correct, save, and print a hard copy.

Project 5

INSTRUCTIONS: The annual staff has asked you to compose a list of all school activities and school clubs. The format is to make two columns, and to center both horizontally and vertically on the page. Provide the proper heading. Proofread, correct, save, and print a hard copy.

Project 6

INSTRUCTIONS: Write a memo to each of the following salespersons informing them of their convention schedule for this month. Also, type the sales convention coordinator a convention schedule in column form. Proofread, correct, save, and print a hard copy.

Marian Hill	2 - 6 Dallas Hilton
	14 - 16 Houston Hyatt
	20 - 26 San Antonio Marriott
Loyd Davee	3 - 7 El Paso Hilton
	14 - 16 Dallas Fairmont
	21 - 27 Houston Adam's Mark
John Anderson	1 - 5 Fort Worth LaQuinta
	13 - 17 Amarillo Sheraton
	22 - 27 Austin Marriott

COMPETENCY CHECKLIST

ESSENTIAL ELEMENT: 75.87(e)(2)(B)

The students will be provided opportunities to: apply the general capabilities of information processing tools and software.

OBJECTIVE: Students will apply the capabilities and features of information processing to produce a document.		MASTERY	NON MASTERY
1.	Outline and explain the steps in the document cycle.	_____	_____
2.	Explain and demonstrate the formatting feature of an information processing software package.	_____	_____
3.	Explain and demonstrate the editing feature of an information processing software package.	_____	_____
4.	Explain and demonstrate the locating feature of an information processing software package.	_____	_____
5.	Explain and demonstrate the searching feature of an information processing software package.	_____	_____
6.	Demonstrate the steps in the document cycle.	_____	_____
7.	Demonstrate the use of the information processing software to produce a report, memo, and letter.	_____	_____
		_____	_____

STUDENT NAME _____

SECTION III
ELECTRONIC SPREADSHEETS

ESSENTIAL ELEMENT

75.87 (e)(3)

Concepts and skills related to spreadsheets.

The student will be provided opportunities to:

- A. demonstrate basic spreadsheet concepts; and
- B. apply general capabilities of spreadsheets.

SUGGESTED UNIT LESSON PLAN

SECTION III: ELECTRONIC SPREADSHEETS

UNIT I: CONCEPTS OF ELECTRONIC SPREADSHEETS

**ESSENTIAL 75.87
ELEMENT: (e)(3)(A)**

**ALLOCATED
TIME: 10 Hours**

UNIT OBJECTIVE: Students will explain for what purpose electronic spreadsheets are used, describe spreadsheet capabilities, use terminology common to most spreadsheet software, compare software packages, and discuss the application of the software to business problems.

**STUDENT
OBJECTIVES:**

After completing this unit, the student will be able to:

1. Describe the structure of electronic spreadsheets, and for what purpose they are used
2. Identify capabilities of electronic spreadsheets
3. Use terminology common to electronic spreadsheets
4. Contrast and compare electronic spreadsheet software packages

FOCUS:

The electronic spreadsheet is the business tool of the 80's. Its versatility, power, and ease of use have made the spreadsheet essential in virtually every office where microcomputers are used. It is used by top management, clerks, and those employees in between. Any time numbers are used, there is an application for a spreadsheet, and new applications are being discovered and developed every day.

DOMAIN:

Activities and competency tests have been designed to provide learning experiences utilizing the affective, cognitive, and/or psychomotor domains.

BASIC SKILLS:

Activities and competency tests have been designed to reinforce the basic skills of reading, writing, and/or mathematics.

CONTENT OUTLINE

- I. Introduction to spreadsheet technology
 - A. Explanation of spreadsheets
 - B. Advantages of using spreadsheets
 - C. Using electronic spreadsheets in business
 - D. Decision making
 - E. Development of the spreadsheet
 - F. The history of VisiCalc
- II. Spreadsheet structure
 - A. Cell representation
 - B. Functions and operations
 - C. Limited data storage
 - D. Modes
 - 1. Wait mode
 - 2. Edit mode
 - 3. Label
 - 4. Value
 - 5. Point
 - 6. Error
 - 7. Menu
- III. Concepts of using spreadsheets
 - A. Screen moves
 - 1. Single cell moves
 - 2. Page moves
 - 3. Go To moves
 - 4. Special moves
 - B. Data entry
 - 1. Labels
 - 2. Numbers
 - 3. Formulas
 - C. Controlling the appearance of data
 - D. Ranges
 - E. Function keys
 - F. Cell addresses
 - G. Moving data and cells
 - 1. Inserting
 - 2. Deleting
 - 3. Moving data
 - 4. Copying
 - 5. Erase
- IV. Capabilities
 - A. Arithmetic
 - B. Functions
 - C. Printing
 - D. Macros
- V. Comparison of spreadsheet packages
 - A. The hardware available
 - B. Software requirements
 - C. Ease of use
 - D. Cost and support

SUGGESTED TEACHER ACTIVITIES

General Teacher Preparation

1. Preview the unit and review objectives.
2. Decide on a variety of instructional methods to present the unit.
3. Prepare questioning techniques and closure statements.
4. Make modifications in curriculum for special needs students.
5. Consult several alternative sources to enhance and update your knowledge of the current trends, issues, and processes related to the unit content.
6. Select exercises, drills, and other resources to use as supplemental materials for the unit.
7. Secure and prepare sufficient quantities of software backup diskettes for student use.
8. When appropriate, take a field trip or have a guest speaker present a portion of the unit describing industry standards.
9. Prepare appropriate bulletin boards and transparencies.
10. Make copies of appropriate handouts, activities, and test materials.
11. Secure overhead projector, LCD computer panel for data projection, and an appropriate screen.

General Classroom Preparations

1. Secure the students' attention.
2. Communicate learning expectations--goals to be accomplished.
3. Emphasize the value/importance of the unit content or activity.
4. Relate unit content to prior or future learning.
 - a. Use discussions and pretests to determine prior knowledge of the unit content.
 - b. From the results of the discussions and pretests, modify your teaching plans to fit student needs.
 - c. Use enthusiasm, and relate the content to the student's interests.

Reteach Activities

1. Use a new method to reteach a unit activity.
2. Using additional resources, create individualized materials for the more and less capable students.
3. Utilize those sections of tests which need additional reinforcement.
4. Utilize unit activities not previously used.
5. Use peer practice for the reteaching of terminology--one student asks about the meaning of a word. The other student has the list of answers (words). Hints will be given until the word is matched with its correct definition.

Specific Teaching Activities

1. Secure sample spreadsheet reports and screen printouts, demonstration disks for various packages, assorted brochures about spreadsheet software, and other supplemental information or examples for this unit.
2. Have an accountant come in to demonstrate and compare an electronic spreadsheet with an accountant's worksheet.
3. Prepare a bulletin board showing the contrast between the accountant's worksheet and the electronic spreadsheet.

Activity One

- Project 2 Secure accountant's worksheets so students can label spreadsheet parts.

Activity Two

- Project 2 Contact local businesses and compile a list of businesses that use electronic spreadsheets so that students may communicate with business persons who use spreadsheets to solve problems or make decisions.

Activity Four

Collect computer newspapers, periodicals, and other current literature containing information about spreadsheet software, and make this literature available to students. You may wish to assign several different software packages per student, and duplicate the worksheets accordingly. Or, assign each student a different software package, and have them report their findings to the class.

ANSWERS TO ACTIVITIES

Activity One

Project 1 The structure of an electronic spreadsheet is similar to an accountant's worksheet with numerous rows and columns. Rows and columns are displayed on the screen and words or values can be entered where desired. Each cell represents a unit of the computer's internal memory.

Project 2 Evaluated to the satisfaction of the instructor.

Activity Two

Project 1 Any ten of the following uses in these four areas:

1. Planning
 - a. Analyzing financial statements
 - b. Forecasting business cycles
 - c. Projecting cash flow
 - d. Trend analysis
 - e. Financial models
 - f. Management models
2. Decision making
 - a. Compare and prepare bids
 - b. Analyze the performance of products
 - c. Compare costs and profit margins for products
 - d. Compare performance of different branches
 - e. Evaluate the results of operational changes
3. Recordkeeping
 - a. Accounting records
 - b. Sales reports
 - c. Production data
4. Selling or convincing others
 - a. Producing figures that people can have confidence in
 - b. Displaying results graphically
 - c. Summarizing important facts

Project 2 Evaluated to the satisfaction of the instructor.

Activity Three

1. Absolute--Referring to a specific row, column, or cell by name, not by its relative location.
2. Address--Also called cell address. The location of a cell, identified by its row and column.
3. Cell--The intersection of a row and column, where data is entered.
4. Format Refers to the rules for how data will be stored and displayed.

5. Formula--Calculation rules that let the computer do mathematics.
6. Global--Refers to a command that applies to the entire worksheet, rather than a cell or limited range.
7. Label--Data in a spreadsheet cell that contains alphanumeric rather than numeric data.
8. Macro--A programming command that gives a name to a sequence of commands.
9. Menu--The method by which commands are usually accessed.
10. Range--A rectangular block of cells that is identified or highlighted.
11. Relative or offset--Describes a cell address in relation to another address rather than by its coordinates.
12. Scroll--To move the worksheet up, down, right, or left to display different portions on the screen.
13. Template--A reusable model of a spreadsheet that has been created with labels, formatting, and formulas, but without variable data.
14. "What-if" model--A technique for experimenting by using a worksheet to change values of data in order to see what the result will be.
15. Window (viewing window)--The portion or portions of the worksheet that are visible on the screen.

Activity Four The worksheet information will vary according to the software evaluated. Project to be evaluated to the satisfaction of the instructor.

COMPETENCY TEST ANSWERS

Project 1	1.	Cell	6.	Template
	2.	Global	7.	Scrolling
	3.	Label	8.	Menu
	4.	Relative or offset	9.	What-if
	5.	Macro	10.	Range

Project 2	1.	F	11.	T
	2.	T	12.	F
	3.	F	13.	T
	4.	F	14.	F
	5.	F	15.	T
	6.	T	16.	T
	7.	F	17.	T
	8.	T	18.	F
	9.	F	19.	F
	10.	T	20.	T

Project 3 All questions evaluated to the satisfaction of the instructor.

SUGGESTED UNIT LESSON PLAN

SECTION III: ELECTRONIC SPREADSHEETS

UNIT II: ELECTRONIC SPREADSHEET APPLICATIONS

ESSENTIAL 75.87
ELEMENT: (e)(3)(B)

ALLOCATED
TIME: 25 Hours

UNIT OBJECTIVE: Students will startup a spreadsheet program, design and use a template, utilize advanced functions of the software, including macros, print and graph commands, and save the results.

STUDENT
OBJECTIVES:

After completing this unit, the student will be able to:

1. Plan a spreadsheet and design a template for it
2. Enter and manipulate data
3. Write and use a simple macro
4. Demonstrate some advanced mathematical functions
5. Print and graph the results, and save the spreadsheet template

FOCUS:

Those who have learned to use an electronic spreadsheet have a valuable skill, but taking full advantage of the power of spreadsheet software calls for more than simply entering data into a predesigned worksheet. Those who benefit most from this important tool are those who use it to solve problems of their own. One can manipulate the software at any level of sophistication he/she desires, including programming the spreadsheet to carry out commands automatically.

DOMAIN:

Activities and competency tests have been designed to provide learning experiences utilizing the affective, cognitive, and/or psychomotor domains.

BASIC SKILLS:

Activities and competency tests have been designed to reinforce the basic skills of reading, writing, and/or mathematics.

CONTENT OUTLINE

- I. Setup procedures
- II. Designing format
 - A. Identify the data to be used
 - B. Inspect data and anticipate the form of the results
 - C. Selecting column and row headings
 - D. Titles or comments, and the headings
 - E. Lock in the titles
 - F. Data entry
- III. Entering and manipulating data
 - A. Enter data
 - B. Enter formulas
 - C. Copy the formulas
 - D. Check results
- IV. Designing templates
 - A. Define templates
 - B. Purpose of templates
 - C. Protecting templates
 - D. Ready-made templates
- V. Using advanced functions
 - A. Advanced mathematical functions
 - B. Kinds of activities for which advanced functions can be used
 - C. Creating and using macros

SUGGESTED TEACHER ACTIVITIES

General Teacher Preparation

1. Preview the unit and review objectives.
2. Decide on a variety of instructional methods to present the unit.
3. Prepare questioning techniques and closure statements.
4. Make modifications in curriculum for special needs students.
5. Consult several alternative sources to enhance and update your knowledge of the current trends, issues, and processes related to the unit content.
6. Select exercises, drills, and other resources to use as supplemental materials for the unit.
7. Secure and prepare sufficient quantities of software backup diskettes for student use.
8. When appropriate, take a field trip or have a guest speaker present a portion of the unit describing industry standards.
9. Prepare appropriate bulletin boards and transparencies.
10. Make copies of appropriate handouts, activities, and test materials.
11. Secure overhead projector, LCD computer panel for data projection, and an appropriate screen.

General Classroom Preparations

1. Secure the students' attention.
2. Communicate learning expectations--goals to be accomplished.
3. Emphasize the value/importance of the unit content or activity.
4. Relate unit content to prior or future learning.
 - a. Use discussions and pretests to determine prior knowledge of the unit content.
 - b. From the results of the discussions and pretests, modify your teaching plans to fit student needs.
 - c. Use enthusiasm, and relate the content to the student's interests.

Reteach Activities

1. Use a new method to reteach a unit activity.
2. Using additional resources, create individualized materials for the more and less capable students.
3. Utilize those sections of tests which need additional reinforcement.
4. Utilize unit activities not previously used.
5. Use peer practice for the reteaching of terminology--one student asks about the meaning of a word. The other student has the list of answers (words). Hints will be given until the word is matched with its correct definition.

Specific Teaching Activities

1. Become familiar with spreadsheet software.
2. Obtain sample formats of manual worksheets, electronically produced worksheets, graphic representations, and spreadsheet software brochures.
3. Prepare transparencies to illustrate the command categories that are common to spreadsheets.
4. Select workbook assignments, or prepare assignments to handout as worksheets.
5. Develop a list of spreadsheet examples, including some to which students can relate.
6. Make printouts and/or transparencies of sample spreadsheets.
7. Identify reference manual sections that will be useful to the students.
8. Select exercises and drills from resources to complete the unit.
9. Duplicate data diskettes with predesigned templates to use for exercises.

Activity Two

- | | |
|------------------|--|
| <u>Project 1</u> | Develop an instruction sheet for students to use in manipulating the data given in Activity One. |
| <u>Project 2</u> | Provide students with commands specific to the spreadsheet program used. Either allow them to find them in the documentation, or write it on the board for them to copy. |

ANSWERS TO ACTIVITIES

Activity One Evaluated to the satisfaction of the instructor.

Activity Two

Project 1 Evaluated to the satisfaction of the instructor.

Project 2 Evaluated to the satisfaction of the instructor.

Activity Three \D ^JAN{RIGHT}^FEB{RIGHT}^MAR{RIGHT}^APR{RIGHT}
^MAY{RIGHT}^JUN{RIGHT}^JUL{RIGHT}^AUG{RIGHT}
^SEP{RIGHT}^OCT{RIGHT}^NOV{RIGHT}^DEC~
{END}{LEFT}

One of several solutions. Will vary according to the spreadsheet program you are using.

Activity Four

1. 4
2. 4
3. 2.8698289
4. 0.658964
5. 2.236067

Activity Five Evaluated to the satisfaction of the instructor.

COMPETENCY TEST ANSWERS

Assuming that the At Bats are in cell addresses C3 through C23, and the Hits are in D3 through D23, the following macro, or its equivalent, will produce the averages.

```
{goto}E3~
+D3/C3~
'/C~{down}. {down 19}~
```

The correct batting averages are:

Anderson	.317	
Baker	.236	
Bell	.222	Total times at bat
Day	.250	
DeVille	.333	722
Dudley	.182	
Gould	.258	Total hits
Grieske	.400	
Guerra	.167	197
Jackson	.231	
Jones	.274	Team Average
Kelly	.320	
King	.299	.253
Martinez	.000	
Melton	.261	Highest average
Phillips	.239	
Rizzo	.305	.400
Roppino	.143	
Tharpe	.316	
Wandowski	.343	
Werington	.214	

TERMINOLOGY

Bar graph	A graph that plots the size of values using bars.
Block	A rectangular portion of a spreadsheet (a range).
Borders	Column and row labels around the outside of a spreadsheet, sometimes may be turned off and on.
Cell	The basic working unit of a spreadsheet; point at which a column and a row intersect; intersection of a row and a column.
Cell address	Column label followed by row label - example: A4.
Cell pointer	Highlighted indicator that designates location of current work area.
Column	A line of vertical information that is labeled sequentially with identifying letters or numbers.
Command line	A row on the screen where available command choices are shown.
Coordinates	Identify the point at which columns and rows meet.
Electronic spreadsheet	A computer program that displays a computerized organization of a columnar pad. A grid of rows and columns where text, numbers, and formulas can be stored and manipulated.
Entry mode	The status of the worksheet when it is available for entering data.
Format	A command used to control the way numbers are displayed on the screen.
Formulas	Arithmetic expressions that tell the computer how to calculate an entry.
Global command	Any command that affects the entire spreadsheet or document.
Graphics	Displaying spreadsheet data values as a bar graph, line graph, or pie chart.
Highlight	To emphasize text on the screen by displaying it in inverse video, or in a color different from the display's regular color.
Label	Any alphanumeric entry on the spreadsheet.
Line graph	A graph on which data is represented by plotting points and joining them.
Macro	A sequence of commands that is saved and can be executed much like a program.
Paging	Scrolling through the worksheet, one full screen at a time.

BCAI/Electronic Spreadsheets/TERMINOLOGY

Pie chart	A chart that illustrates relationships of parts to a whole. Each value is represented as a percentage of the pie or circle.
Pointing mode	Commands or formulas are completed by pointing to cells with the cursor, instead of typing in all the cell addresses.
Range	A rectangular group of cells; a block.
Rows	A horizontal line of cells in the worksheet.
Scroll	A method of viewing sections of the worksheet when all sections cannot be seen at one time. The worksheet is shifted up, down, right, or left.
Stacked-bar graph	A graph that has values stacked on top of each other as opposed to side-by-side.
Values	Numbers or formulas that can be used in calculations.
What if	The kind of question that spreadsheets are designed to help answer (about numeric data).
Window	The part of the spreadsheet seen on the screen at one time.
Worksheet	Another name for spreadsheet.

BCA/Electronic Spreadsheets/RESOURCES

TEXTBOOKS

*APPLEWORKS - INTEGRATED APPLICATIONS
FOR MICROCOMPUTER*
Clayton & Park

*COMPUTING TODAY: MICROCOMPUTERS AND
APPLICATIONS*
Houghton Mifflin Publishing Co.

*INTEGRATED SOFTWARE: PRINCIPLES AND
APPLICATIONS USING LOTUS 1-2-3*
Close

INTRODUCING COMPUTERS
John Wiley & Sons

THE LOTUS GUIDE TO LEARNING 1-2-3
Addison-Wesley

PRACTICE SETS

1-2-3 RUN
Flast and Flast

1-2-3 QUICK
Smith

THE AUDITING CLERK
South-Western Publishing Company

*APPLEWORKS - INTEGRATED APPLICATIONS
FOR MICROCOMPUTER*
South-Western Publishing Company

*INTEGRATED SOFTWARE: PRINCIPLES
AND APPLICATIONS USING LOTUS 1-2-3*
Close

THE LOTUS GUIDE TO LEARNING 1-2-3
Lotus Development Corp.

MICROCOMPUTER SIMULATIONS IN BUSINESS
South-Western Publishing Company

*SPREADSHEET SKILL BUILDING EXERCISES
AND APPLICATIONS*
Dictation Disc Co.

SOFTWARE

APPLEWORKS
Apple Computer

ELECTRIC DESK
Alpha Software

LOTUS 1-2-3
Lotus Development Corp.

MICROSOFT WORKS
Microsoft

MULTIPLAN
Microsoft

OPEN ACCESS
Software Products International

PFS: PLAN
Software Publishing Corp.

PLANNING ASSISTANT
IBM Personal Computer Division

*PLANNING ASSISTANT INSTRUCTIONAL
MODULE*
Pass Publications

SUPERCALC 3a/4
Computer Associates

ADDITIONAL SOFTWARE

CLASS SPREADSHEET
J. Weston Walch, Publisher
Apple II, IIE, IIC 48k
IBM PC; XT, AT, 128k

COMPUTER APPLICATIONS: SPREADSHEETS
Educational Activities Inc.
Apple II, IIE, IIC 48k
IBM PC; XT, AT, 128k

ELECTRONIC SPREADSHEET
Minnesota Educational Computing Corporation
IBM PC; XT, AT, 128k

*ELECTRONIC SPREADSHEETS: AN
INTRODUCTION*

Educational Activities Inc.
Apple II, IIE, IIC 48k
IBM PC; XT, AT, 128k

INDIVIDUAL TRAINING FOR LOTUS 1-2-3

Individual Software Inc.
Learning Services
IBM PC; XT, AT, PS2 128k

MICROSPREADSHEET I: INTRO TO VISICALC

J. Weston Walch, Publisher
Apple II, IIE, IIC 48k
IBM PC; XT, AT, 128k

P & L SPREADSHEET

Learning Services
IBM PC; XT, AT, PS2 128k

POCKET PLANNER II

Learning Services
Comm 64/128

SIDEWAYS

Funk Software
IBM PC; XT, AT, 256k

SPREADSHEET APPLICATIONS

South-Western Publishing Co.

VP PLANNER

Paperback
IBM PC; XT, AT, 256k

REFERENCES

EXCELL MACROLIBRARY

Que Corporation

*LOTUS 1-2-3: SECRETS, SOLUTIONS,
SHORTCUTS*

Greg M. Perry
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

USING 1-2-3 RELEASE 3.0

Mark S. Matthews and Carole Boggs Matthews
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

*USING QUATTRO: THE PROFESSIONAL
SPREADSHEET*

Stephen Cobb
Borland, Osborne, and MicroPro
McGraw-Hill Publishers

SECTION III: ELECTRONIC SPREADSHEETS

UNIT I: CONCEPTS OF ELECTRONIC SPREADSHEETS

UNIT OBJECTIVE:

Students will explain for what purpose electronic spreadsheets are used, describe spreadsheet capabilities, use terminology common to most spreadsheet software, compare software packages, and discuss the application of the software to business problems.

STUDENT OBJECTIVES:

After completing this unit, the student will be able to:

1. Describe the structure of electronic spreadsheets, and for what purpose they are used
2. Identify capabilities of electronic spreadsheets
3. Use terminology common to electronic spreadsheets
4. Contrast and compare electronic spreadsheet software packages

GENERALIZATION:

The electronic spreadsheet is the business tool of the 80's. Its versatility, power, and ease of use have made the spreadsheet essential in virtually every office where microcomputers are used. It is used by top management, clerks, and those employees in between. Any time numbers are used, there is an application for a spreadsheet, and new applications are being discovered and developed every day.

UNIT OVERVIEW

I. Introduction to spreadsheet technology

A. Explanation of spreadsheets

1. Accountants are familiar with the spreadsheet because they are accustomed to working with numerous rows and columns of data.
 - a. The name "spreadsheet" comes from the term accountants use to describe the large worksheets on which they organize their figures and categories.
 - b. Electronic spreadsheets follow the same format, except that the computer's memory and screen replace the paper.
2. Rows and columns are displayed on the screen, and words or values can be entered where desired.
 - a. The small size of the screen is no limitation because the spreadsheet can be much larger than what can be seen at one time.
 - b. The computer's computational powers are available for adding, subtracting, or doing any kind of manipulation of the data, once entered.
 - c. Any kind of problem that can be set up using this format can be solved with an electronic spreadsheet.

B. Advantages of using spreadsheets

1. Spreadsheets give the microcomputer user a combination of flexibility and ease of use with a power of calculation that has generally not been available, even on minicomputer systems.
 - a. Budgeting, financial analysis, and forecasting are much more fluid tasks with the use of spreadsheets.
 - b. There are several reasons why they work so well.
2. Spreadsheets allow for neat, organized entry of numerical information.
 - a. Changes may be made whenever necessary either to update or to correct mistakes.
 - b. Therefore, the end product does not have any messy erasures or cross outs.

3. Only the amount of memory in the computer limits the size of the spreadsheet.
 - a. Pencil and paper spreadsheets become impossible to handle with only 20 or 30 rows.
 - b. The electronic spreadsheet may be hundreds of entries long and wide.
 - c. The calculations may be changed quickly, and movement around the various worksheets can be accomplished quickly.
 4. Mathematical formulas, figures, and labels may be entered into spreadsheets. Calculators are eliminated--all calculations are completed within the electronic worksheet.
 5. Refiguring of the results of all formulas whenever a number is changed can be accomplished with one keystroke, thus allowing "what if" questions to be answered.
- C. Using electronic spreadsheets in business
1. The first users to discover spreadsheets were management level executives, who found them invaluable for activities such as sales summaries, planning, and forecasting.
 - a. The spreadsheet is often thought of primarily as a decision-making tool.
 - b. Users at all levels have found that numerical data can be handled more easily with a spreadsheet than any other way. Below are examples of the types of help that business people can get from using spreadsheets.
 2. Planning
 - a. Analyzing financial statements
 - b. Forecasting business cycles
 - c. Projecting cash flow
 - d. Trend analysis
 - e. Financial models
 - f. Management models

3. Decision making
 - a. Compare and prepare bids
 - b. Analyze the performance of products
 - c. Compare costs and profit margins for products
 - d. Compare performance of different branches
 - e. Evaluate the results of operational changes
 4. Record keeping
 - a. Accounting records
 - b. Sales reports
 - c. Production data
 4. Selling or convincing others
 - a. Producing figures in which people can have confidence
 - b. Displaying results graphically
 - c. Summarizing important facts
- D. Decisions to make--Decision-making assistance continues to be the most valuable reason for using a spreadsheet because it allows users to do things that could not be done without it.
1. The ability to change one figure and let the computer totally recalculate a set of results means that decisions can be tried in advance on the computer, without spending any money.
 2. While it is still true that the results are only as good as the data that goes in, a carefully designed spreadsheet is as accurate as the same data in any other form and is tremendously more flexible.
- E. Development of the spreadsheet
1. The first spreadsheet program (VisiCalc) was designed for the Apple II.
 - a. Like so much of the software used in the 1980s, it was not developed commercially at first, but by an individual for his own use.
 - b. VisiCalc's value was soon recognized, and it became the best-selling computer program in the microcomputer world.

2. Before long, versions were made for other popular micros, and this was followed by a rush of competitors, each trying to capture a market share by offering improvements and new features.
3. The all-time best-selling program, LOTUS 1-2-3, was developed for the IBM personal computer, and is available for all compatible models.
 - a. Many other spreadsheet programs have come along since 1-2-3, and although LOTUS Corporation has come out with even more sophisticated software, 1-2-3 still ranks at the top in 1988.
 - b. LOTUS 1-2-3 is not only a spreadsheet: it also integrates a database program and a graph generator.

F. The history of VisiCalc

1. Because it was first, VisiCalc rates a special place in history.
 - a. VisiCalc was the invention of Dan Bricklin, who at the time was a graduate student at Harvard Business School.
 - b. He designed it as a way to save time and effort in doing some of his assignments.
2. Bricklin and a friend, Robert Frankston, formed their own company to market the exciting new program in 1979.
 - a. VisiCalc took Apple II users by storm nationwide. Wherever it was shown, Apple owners clamored to buy it.
 - b. Another product from their company, Desktop Plan, came out about the same time, and was received with excitement, but did not achieve the success of VisiCalc.
3. Bricklin and Frankston soon produced versions of VisiCalc for all the popular microcomputers of the time. Sales continued to be high until, gradually, competitors' products took more and more of the market share, and at the same time, the sellers and producers of VisiCalc were having internal conflicts.
4. VisiCalc is no longer produced, and the popular Appleworks program has almost sole possession of the Apple II market for spreadsheets and integrated software. As stated above, LOTUS 1-2-3 and its competitors control the MS-DOS (IBM compatible) market.

II. Spreadsheet structure--To the user, a spreadsheet appears as a table of cells, some of which are displayed on the computer's screen while the program is in operation.

- A. Each cell actually represents a unit of the computer's internal memory.

1. Any type of data can be stored in each of these memory locations but numbers are stored using a different type code than text and special characters. That is why there are different rules for label cells and value cells.
 2. The label cell data is stored using the text code.
- B. Each of the functions and operations that are performed cause the computer to make changes in the contents of one or more memory locations.
1. Sometimes it means moving or copying from one location to another.
 2. Sometimes it means placing a different value in a location.
 3. Part of the computer's memory is dedicated to keeping up with where everything is stored. It uses a kind of index system, so that when a row of figures is used, any reference to it will be forwarded to the right place.
- C. The amount of data that can be stored is limited because the data in the cells, the instructions for carrying out the commands, the commands themselves, and the index and instructions that go with it are all in memory at once.
1. Most computers that are used in classrooms have enough memory for between 64,000 and 640,000 characters; thus, the maximum size of the spreadsheet varies considerably.
 2. In businesses, this memory amount varies even more with hard disks.
- D. There are different modes during operation of a spreadsheet program. When the program is in "ready" mode, it is ready for data to be entered, or for a command to be given. When it is in any other mode, only keystrokes recognized for that mode will be accepted. The modes vary with the software product.
1. Wait mode--The computer is busy with some operation, such as calculating or saving a file. No command will be accepted until the computer is finished.
 2. Edit mode--Any cell that the cursor highlights can be edited, but nothing else is allowed. If an error in syntax has been made during data entry, the program will automatically go into edit mode. The user can also point to a cell, and give a command that will put the program into edit mode.
 3. Label--When the first character has been typed during data entry, if it is a letter or special character (with certain exceptions), the program goes into label mode, and everything that is typed in the cell will be considered a label.

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4. Value--When the first typed character is a digit or sign (or certain special characters), the program is in value mode. Value mode is used for entering formulas.
5. Point--If a command is started that requires additional information about the data to be operated upon, the program is in point mode until the command is completed.
6. Error--A command, function, or formula has been entered incorrectly. The only remedy is to escape with the ESC key. This will back it up to the previous step.
7. Menu--Pressing the key that activates the command menu puts the program into menu, or command, mode. Only a recognized command, or the Escape key is accepted.

III. Concepts of using spreadsheets.

A. Screen moves

1. Single cell moves--When working with data on the screen, arrow keys allow the user to move in any direction, to the cell above, below, right, or left. This results in scrolling, one row or column at a time.
2. Page moves--For faster movement with larger spreadsheets, there are commands to move the pointer the distance of an entire screen display, in any of the four directions. This results in much faster scrolling because of the larger jumps.
3. Go To moves--A function key is used to command the program to move immediately to any desired place in the worksheet, identified by a cell address.
4. Special moves--Commands can be given to go to the beginning or end of the worksheet, or to a location of an identified block of cells.

B. Data entry--Data that is typed into a worksheet is always identified as one of three types.

1. Labels

- a. On the original spreadsheet, labels were column and row headings. These headings were needed to identify the contents of the rows and columns of the worksheet.
- b. As spreadsheets began to be used for so many other purposes, many other uses were found for labels, so that paragraphs of text are often included as labels.
- c. When data is entered into a cell, it is recognized as a label if it begins with a letter, blank space, or most special characters.

- d. Once identified as a label, the cell may not be used for calculations or other numeric functions, even if the data is a blank space followed only by digits.
- e. Labels are normally entered left-justified, meaning they begin in the first column of the cell, but labels can also be centered, or lined up on the right, if desired.

2. Numbers

- a. Any data that is to be used in calculating is considered numeric.
- b. It is identified by the program as numeric if it begins with a digit, plus or minus sign, or certain special characters.
- c. When numbers are entered, they are automatically right-justified, meaning they are lined up in columns with an even right-hand margin.
- d. A number cannot be centered or left-justified. Any attempt to do so will result in it being changed to a label.

3. Formulas

- a. Formulas are treated as numeric cells, but instead of entering a value which is displayed in the cell, an expression is typed in, and the evaluated result is displayed in the cell.
- b. The expression can be made up of any combination of numbers, cell addresses, and arithmetic operators or functions. The entry rules are the same as for numbers.
- c. Because formulas frequently begin with a cell address which starts with a letter, a plus sign or left parenthesis can be used to indicate that the entry is not a label.
- d. There is a formatting option that will permit the formula to be displayed in the cell, as well as the calculation results.

C. Controlling the appearance of data

- 1. Two ways of controlling appearance are (1) changing the size of the cells, and (2) giving format specifications for numeric and formula cells.
 - a. Column width
 - (1) The user can override the default column width (usually nine characters) with a command that changes the width of all columns, or a command to change a single column.

- (2) If a column is too narrow to hold all the data that has been entered into a cell, the data will still be stored, but it will not be visible unless the cell width is altered.
- (3) An exception is when label data, such as a long title, exceeds the width of the cell, and the adjacent cell(s) on the right are empty.
- (4) In this circumstance, the label will "spill over" into the empty columns on the screen display. If data are entered later into the empty cell, the "spilled over" data will no longer be visible. It will, however, still be stored in memory.

b. Format specifications

- (1) Additional commands allow greater control over numeric cells. The default is usually to display a number just as it was entered, without any commas or dollar signs. If a number is too large, it will be displayed in scientific notation.
- (2) There are several options that can be selected, either for a particular cell or range of cells, or for the entire worksheet.
 - (a) Currency--This option displays all numbers in standard dollars and cents form.
 - (b) Fixed decimal places--The user can specify how many places numbers will be carried.
 - (c) Comma--Large numbers can be grouped in the normal way, with commas.
 - (d) Percentage--The value will be multiplied by 100, and a percent sign displayed.
 - (e) Signs--Plus or minus signs can be displayed.

D. Ranges

- 1. Blocks of data cells that are to be used together for some commands may be highlighted together so that one command will perform the operation on all the data.
- 2. If the same block will be used frequently, it may be given a name for easy reference. When this is done, it is called a range name. The ability to address a range of data as a unit is a great timesaver when working with a spreadsheet.

E. Function keys

1. Software developers can predict what commands will be used most often, and can assign those commands to one of the computer's special function keys.
2. The result of this designation is the reduction of several keystrokes each time the command is called. Some of the commands that are frequently assigned to function keys are Go To, Edit, and Calculate.
3. The use of the function keys is not the same for all spreadsheet programs.

F. Cell addresses

1. Each individual cell can store data, and each cell has an address. This address is a combination of coordinates.
2. Columns are identified by letters, starting with A through Z, then AA, AB, AC and so on.
3. Rows are numbered beginning with 1.
4. The upper left cell address is A1.
5. The total number of available rows and columns varies with the software, but in reality, there are usually more cells available than there is memory to store them.
6. A cell can be referred to by its address, or in relation to its distance from another known location. This relationship is called an offset, and is useful for many timesaving operations.

G. Moving data and cells--There was not much an accountant could do to change the rows and columns of a paper spreadsheet once it was started. With an electronic spreadsheet, there is almost no limit to the possible moves and changes.

1. Inserting--A row or a column can be added at any time. All the columns to the right of an inserted column, or all rows below an inserted row are renamed correspondingly, and all existing formulas are adjusted for the new addresses.
2. Deleting--Rows or columns can be removed as easily as they can be inserted. Again, the other row or column names are adjusted as needed, as are formula references. Any data stored in the deleted cells is lost.
3. Moving data--The contents of any cell, or range of cells can be relocated from one address to another.

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4. Copying--Cell data is moved to a new location, but not deleted from the previous location. As many copies can be made as desired.
 5. Erase--The contents of a cell can be deleted without changing the arrangement of cells.
- IV. Capabilities--Once data are entered into cells, there are a number of operations that can be performed.
- A. Arithmetic--Addition, subtraction, multiplication, division, and exponentiation are performed with the use of operators in formulas.
 - B. Functions--Many special operations are named within the spreadsheet software, and can be called upon within a formula. Which functions are available varies with the software.
 1. Mathematical--Some or all of the following may be included.
 - a. INT--Finds the whole number value of a cell
 - b. MOD--Finds the integer remainder in division
 - c. SQRT--Finds the square root
 - d. ABS--Finds the absolute value
 - e. RAND--Chooses a random number between 0 and 10
 - f. ROUND--Rounds to a given number of places
 - g. LOG--Finds the Log base 10
 - h. EXP--The exponentiation function
 - i. LN--The Natural Log
 - j. PI--The value 3.14159
 2. Trigonometric functions--SIN, COS, TAN, ASIN, ACOS, ATAN are all available with some software.
 3. Statistical--Most programs have the following capabilities:
 - a. SUM--Totals any group of cells
 - b. AVG--Averages a set of values

- c. COUNT--Finds out how many cells have values
- d. MAX--Finds the highest number in a group of values
- e. MIN--Finds the lowest number in a group of values
- f. STD--Standard deviation (not in all software)
- g. VAR--Variance (not in all software)
- 4. Financial functions--If this capability is available, the following functions are usually included.
 - a. PV--Present value
 - b. NPV--Net present value
 - c. FV--Future value
 - d. IRR--Internal rate of return
 - e. PMT--Required payment per period
- 5. Logical functions--There are some advanced functions available, but they are not listed here. The logical operator IF allows conditional operations.
- 6. Date and time functions
 - a. DATE--Displays the current date
 - b. TODAY or NOW--Displays date and time
- C. Printing--All or any portion of a worksheet can be sent to the printer using special printer commands.
 - 1. There is often a special "screen dump" command to make a hard copy of a particular screen display. A report can be designed and stored on a disk for later printing if it is not convenient to print at the time it is saved.
 - 2. If the desired report is too wide for the printer, there are special programs available that can be used with the spreadsheet software. These programs permit a dot matrix printer to print the report sideways on the paper so that it can be as wide as necessary.

3. Some possible print options include control of:
 - a. Top, bottom, left, and right margins
 - b. Paper length
 - c. Lines per inch
 - d. Special codes for printer--can vary the print size and style
 - e. Headers and footers to be repeated on each page
 - f. Borders--certain columns or rows can be repeated on every page
- D. Macros--Stored command sequences are called macros. This feature is available on most, but not all spreadsheet packages.
 1. A great deal of work can go into designing a spreadsheet and manipulating the data.
 - a. Entering the data is usually only a minor part of the effort. If the same spreadsheet is to be run regularly, a template is used, but there still may be many steps required after the new data has been entered.
 - b. These steps can be saved as a sequence of commands, and given a name.
 2. Many people believe that macros are complicated and difficult to use.
 - a. Many of the handiest ones are quite simple, and are as easy to learn as other commands.
 - b. The secret is to make a detailed list of the keystrokes that are to be included, before attempting to type them in as a macro.
- V. Comparison of spreadsheet packages--Several factors should be considered when deciding which spreadsheet program to use.
 - A. The hardware available--While much software is written with versions for different microcomputer groups, most spreadsheet programs are designed to run on specific computers (and those that are compatible). To make comparisons, an easy method is to compare other software with the one that is most popular. The most widely used Apple II spreadsheet is the one included with AppleWorks integrated software. The most popular program for MS-DOS machines is LOTUS 1-2-3, also an integrated package.
 - B. Software requirements--When choosing software, needs should be analyzed, including size requirements and necessary functions. If there is a specific job that the software is being bought to solve, examine the software's capability to handle that problem.

- C. Ease of use--If the program is time-consuming to learn and cumbersome to use, it may be a more sophisticated and complex program than is needed.
- D. Cost and support--If the budget will only allow an inexpensive program, be sure it is reliable, and will do the job. Reputable software vendors are responsive to users' problems. Check with others who have used the program.

STRUCTURE OF ELECTRONIC SPREADSHEETS

Project 1

INSTRUCTIONS: Explain the structure of the electronic spreadsheet.

Project 2

INSTRUCTIONS: Using a bookkeeper's worksheet provided by your teacher, label the parts of it as if it were a spreadsheet.

USES AND CAPABILITIES OF ELECTRONIC SPREADSHEETS

Project 1

INSTRUCTIONS: List 10 ways an electronic spreadsheet can be used.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Project 2

INSTRUCTIONS: Contact two businesses (assigned by your teacher) that use spreadsheets so that you can assemble a list of genuine business problems that are being solved with spreadsheets.

TERMINOLOGY

INSTRUCTIONS: Define the following terms:

1. ABSOLUTE
2. ADDRESS
3. CELL
4. FORMAT
5. FORMULA
6. GLOBAL
7. LABEL
8. MACRO
9. MENU
10. RANGE
11. RELATIVE OR OFFSET
12. SCROLLING
13. TEMPLATE
14. WHAT-IF MODEL
15. WINDOW

COMPARISON OF SPREADSHEET SOFTWARE

INSTRUCTIONS: Using the following worksheet and current literature on spreadsheet software, give the requested information.

SPREADSHEET SOFTWARE COMPARISON WORKSHEET

Name of the spreadsheet software:

What are the hardware requirements?

- 1.
- 2.
- 3.
- 4.
- 5.

Number of rows available

Number of columns available

Maximum amount of memory that can be used

Is graphics capability built-in?

Are multiple windows supported?

Are adequate learning or tutorial materials included?

What other applications (if any) are integrated with the software?

What other programs can be used for importing or exporting files?

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How is the command menu activated?

Where is the command menu displayed?

List the commands available by means of function keys.

What mathematical functions are available?

What logical operations are included?

What printer options are available?

How is on-line Help accessed?

Comment on any valuable additional features.

Comment on any important shortcomings.

COMPETENCY TEST

Project 1

INSTRUCTIONS: Complete the following statements with the appropriate term.

1. The intersection of a row and column on a spreadsheet is called a _____.
2. A _____ command is one that applies to the entire spreadsheet.
3. Spreadsheet data that consists of characters is called a _____.
4. Reference to a cell in relation to another cell is called a _____ reference.
5. A _____ command consists of a sequence of commands and/or functions.
6. A spreadsheet model with labels and formulas, but no data is a _____.
7. Moving up, down, right, or left through a worksheet is called _____.
8. Most commands are accessed through a command _____.
9. Business people use a " _____ " model as a technique for experimenting with different data values.
10. A _____ is a rectangular block of one or more cells within a spreadsheet.

Project 2

INSTRUCTIONS: Place T for True or F for False in front of each question.

- _____ 1. The four keys with arrows on them are called function keys.
- _____ 2. The columns in a spreadsheet are identified by letters.
- _____ 3. A cell is addressed by the row identifier, followed by the column identifier.
- _____ 4. All screen moves are made one column or row at a time.
- _____ 5. The electronic spreadsheet was modeled after the architect's worksheet.
- _____ 6. Formulas are treated as values, like numeric cells, rather than as labels.
- _____ 7. Numeric data can be lined up either on the left or the right within a cell.
- _____ 8. Labels may be lined up on the left or right, or they may be centered within a cell.
- _____ 9. The width of label cells can be changed, but the width of numeric cells is always the same.

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- ____ 10. Cells can be formatted to display numbers with percent signs.
- ____ 11. Function keys are used to conserve keystrokes.
- ____ 12. Data can be moved from one column to another, but not to another row.
- ____ 13. It is possible to insert a new row between two existing rows, without disturbing the data.
- ____ 14. A column may be deleted, but only if it contains no data.
- ____ 15. Spillover of data into an adjacent column applies only to labels.
- ____ 16. Data can be erased from any cell unless it is protected.
- ____ 17. Mathematical functions have special names, and are used in formulas.
- ____ 18. When the date function is called, the user is asked to type in the current date.
- ____ 19. A special program is needed to control printer options, such as margins and spacing.
- ____ 20. The logical function IF, makes conditional operations possible.

Project 3

INSTRUCTIONS: Discuss the following questions.

- 1. Describe what factors should be considered in comparing spreadsheet software packages.
- 2. Describe the different types of business applications for spreadsheet software.
- 3. How is the maximum allowable size for a worksheet determined?
- 4. Name and describe three different modes in which a spreadsheet program might operate.
- 5. Draw and describe the components of a spreadsheet screen.

COMPETENCY CHECKLIST

ESSENTIAL ELEMENT: 75.87 (e)(3)(A)

The student will be provided opportunities to: demonstrate basic spreadsheet concepts.

OBJECTIVE:	Students will explain for what purpose electronic spreadsheets are used, describe spreadsheet capabilities, use terminology common to most spreadsheet software, compare software packages, and discuss the application of the software to business problems.	MASTERY	NON MASTERY
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- | | | | |
|----|--|-------|-------|
| 1. | Describe the structure of electronic spreadsheets, and for what purpose they are used. | _____ | _____ |
| 2. | Identify capabilities of electronic spreadsheets. | _____ | _____ |
| 3. | Use terminology common to electronic spreadsheets. | _____ | _____ |
| 4. | Contrast and compare electronic spreadsheet software packages. | _____ | _____ |
| | | _____ | _____ |
| | | _____ | _____ |

STUDENT NAME _____

SECTION III: ELECTRONIC SPREADSHEETS

UNIT II: ELECTRONIC SPREADSHEET APPLICATIONS

UNIT OBJECTIVE:

Students will startup a spreadsheet program, design and use a template, utilize advanced functions of the software, including macros, print and graph commands, and save the results.

STUDENT OBJECTIVES:

After completing this unit, the student will be able to:

1. Plan a spreadsheet and design a template for it
2. Enter and manipulate data
3. Write and use a simple Macro
4. Demonstrate some advanced mathematical functions
5. Print and graph the results, and save the spreadsheet template

GENERALIZATION:

Those who have learned to use an electronic spreadsheet have a valuable skill, but taking full advantage of the power of spreadsheet software calls for more than simply entering data into a predesigned worksheet. Those who benefit most from this important tool are those who use it to solve problems of their own. One can manipulate the software at any level of sophistication he/she desires, including programming the spreadsheet to carry out commands automatically.

UNIT OVERVIEW

- I. Setup procedures
 - A. Like most commercial software, spreadsheet programs must be set up for the particular hardware configuration on which they will be used. (This is particularly true for LOTUS 1-2-3, because if the program disk is not set up for the correct monitor, the program will lock up the entire system.) There is usually a special program or routine on the disk for the purpose of making the spreadsheet program compatible with the hardware used. If the software has already been installed or used on the system, this step is not needed.
 - B. Starting up the operating system and executing the spreadsheet program by name will bring up a menu that can be followed.
- II. Designing format--If the work to be done is a new application, the first step is to plan the layout of the data.
 - A. Identify the data that is to be used, and determine how many rows and columns will be needed.
 - B. By inspecting the data, and anticipating the form of the results, decide what column widths and formats will be needed.
 - C. Choose column and row headings to best fit the data and the column sizes chosen.
 - D. Type in any titles or comments, and the headings.
 - E. Lock in the titles, if desired, and save the program.
 - F. The spreadsheet is now ready for data entry. If it later becomes apparent that column sizes or sequencing need improvement, be sure to save the layout again after making changes.
- III. Entering and manipulating data--Sometimes the best procedure is to enter all the data before doing any calculations, copying, or moving. The problem itself usually determines what will work the best. Errors should be corrected as soon as they are discovered.
 - A. Enter the data into the cells. Work either vertically or horizontally, whichever is easiest for the data being used.
 - B. Enter formulas that are to be used to calculate results. Be sure that the cells for the results are correctly formatted.
 - C. Copy the formulas to other cells, if the same formula is to be applied to additional rows and/or columns.
 - D. Check to see that results are as expected.

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- IV. Designing templates--A template is merely the part of the spreadsheet that is reusable, without the data.
 - A. The template is actually a model that has the labels and the formulas in place, but has blank cells for the user to place the data.
 - B. It guides the user through the process of entering data, but prevents the user from modifying the template's formulas.
 - C. A template is protected by hiding the worksheet's calculations from view, and by creating forms that help guide data entry.
 - D. Hundreds of complex templates have been designed and saved, and are available at low or no cost from user groups, public domain software libraries, or from other users. There may not be one which exactly fits every need, but there is probably one that can be adapted.
- V. Using advanced functions--Many spreadsheet users do all their number work on the computer, but never use advanced commands (and may not even be aware of them). Some of these commands, however, are the greatest worksavers of all.
 - A. Advanced mathematical functions--All of the computer's mathematical capabilities are available for the worksheet formulas, but some functions would be too complex for users to enter. The built-in functions are designed to make it simple to do all the most necessary calculations.
 - B. There are several kinds of activities for which business users frequently need these special mathematical functions.
 - 1. Statistics--When calculating averages, such as average monthly sales, or average yearly income, the @AVG function averages a range of cells in one step.
 - 2. Standard deviation (@STD), and variance (@VAR) are measures that determine the significance of differences between results. These are important when analyzing results.
 - 3. Financial functions--Many predictions and forecasts are based upon calculating the future value of an investment. The Future value function (@FV) performs these calculations. Other measures such as Present value (@PV), Net present value (@NPV), and Internal rate of return (@IRR) can be used to compare the relative value of two or more investments. When borrowing or lending money, the payment amount can be determined based on the term of the loan and the interest rate, using the Required payment per period function (@PMT).

4. Other mathematical functions that are sometimes used in business include the Exponential function (@EXP), which is useful in amortization (mortgage payment) schedules, and the Random function (@RAND), which selects random numbers between 0 and 10. This function is most often used in simulations in order to generate random test data for simulating real life situations (@RAND is also used in games).
5. These functions can be used even by those who do not completely understand the mathematics behind them since the instruction manuals clearly explain the steps for using advanced functions.

C. Creating and using Macros

1. Consult the software reference manual for exact procedures, but the following represents typical steps in creating a macro.
 - a. Determine what steps and commands the macro will execute.
 - b. Execute the steps manually, one at a time, carefully writing down each keystroke as it is pressed, including the enter key.
 - c. For each command that is represented by a non-printable character, such as the backspace, function, and home keys, consult the list in the manual for the correct code to use. Substitute these codes for the keystrokes on the list.
 - d. Choose an unused area of the worksheet to store the macro commands.
 - e. Carefully type in each keystroke in the correct sequence. This can be done with one command or several to a cell, but commands must be in the correct order, and must be entered in adjacent rows in a single column.
 - f. Give a one letter name to the range of cells containing the macro commands.
2. To use the macro, first be sure that all the data and formulas needed have been entered, and be sure the pointer is at the correct place to begin the execution of the macro.
3. Enter Command Mode, and hold down the Alt key, followed by the letter of the macro name. If everything has been planned and entered correctly, the macro will execute. A macro can be executed one step at a time, for testing and checking.

PLANNING AND DESIGNING A SPREADSHEET TEMPLATE

INSTRUCTIONS: Plan a spreadsheet and design a template for entering the following information.

The Davidson Company needs a report of travel expenses for their sales staff ending the current month. Totals are needed for each salesperson's total expense for his/her trip(s), and for combined staff expenses and transportation, and combined staff total expenses.

Mr. Fairfield was in Dallas on the 8 - 12; his expenses were \$475.00 and transportation was \$130.00.

Mrs. Green was in Houston on the 12 - 17; her expenses were \$576.98 and transportation was \$135.00.

Mr. Carson was in Dallas on the 1 - 4; his expenses were \$375.59 and transportation was \$108.00.

Mrs. Green was in Little Rock on the 20 - 25; her expenses were \$889.32 and transportation was \$185.00.

Mr. Hooper was in Topeka on the 10 - 14; his expenses were \$365.65 and transportation was \$150.00.

Mrs. Anderson was in St. Louis on the 13 - 16; her expenses were \$304.76 and transportation was \$195.00.

Mr. Carson was in Dallas on the 10 - 14; his expenses were \$435.43 and transportation was \$108.00.

Mrs. Anderson was in San Antonio on the 22 - 26; her expenses were \$687.34 and transportation was \$135.00.

ENTERING AND MANIPULATING DATA

Project 1

INSTRUCTIONS: Using the information and the template you designed in Activity One, enter and manipulate the data according to the instruction sheet provided by your teacher.

Project 2

INSTRUCTIONS: Give the command which executes each of the following operations for the spreadsheet program that you are using.

1. Load the program
2. Call for on-screen help
3. Retrieve a template-worksheet
4. Getting around the spreadsheet

To Move cursor:

To top-left corner of spreadsheet

One column left

One column right

One row up

One row down

To beginning of row

To end of row

To top of column

To scroll screen up

To scroll screen down

To scroll screen right

To scroll screen left

To a specific cell

To lower-right corner of worksheet

To upper-left corner of screen

To lower-right corner of screen

Between windows

5. Getting out of trouble
6. Entering labels
7. Repeating labels
8. Entering numbers
9. Editing while entering
10. Editing after entering
11. Recalculating the spreadsheet
12. Saving a worksheet
13. Clearing the worksheet

BCAI/Electronic Spreadsheets/Electronic Spreadsheet Applications/ACTIVITY TWO (Continued)

14. Quitting the program
15. Entering formulas
16. Using cursor pointing
17. Erasing cell contents
18. Setting global formats
19. Formatting a cell or range of cells
20. Changing the width of all columns
21. Changing the width of a single column
22. Changing recalculation
23. Copying
24. Moving data
25. Inserting rows
26. Deleting rows

BCA/Electronic Spreadsheets/Electronic Spreadsheet Applications/ACTIVITY TWO (Continued)

- 27. Inserting columns
- 28. Deleting columns
- 29. Using windows
- 30. Using fixed titles
- 31. Specifying absolute references
- 32. Use several advanced functions

- 33. Combining files
- 34. Extracting a range
- 35. Printing to the disk
- 36. Printing formulas

- 37. Creating a graph
- 38. Creating a macro
- 39. Invoking a macro

USING MACROS

INSTRUCTIONS: Write and invoke a simple macro named "D" to create column headers which contain the three letter abbreviations of the months of the year.

ADVANCED MATHEMATICAL FUNCTIONS

INSTRUCTIONS: Given the following mathematical functions, list the results of each operation.

1. @ABS(-4)
2. @INT(4.357)
3. @LN(17.634)
4. @LOG(4.56)
5. @SQRT(5)

PRINTING, GRAPHING, AND SAVING SPREADSHEET REPORTS

INSTRUCTIONS: Enter the following information into a spreadsheet, and construct a pie and bar graph.

Student Enrollment

Freshmen	432
Sophomores	387
Juniors	379
Seniors	365

COMPETENCY TEST

INSTRUCTIONS: Create a spreadsheet to calculate baseball team averages.

1. Write a macro for calculating batting averages. The macro should divide the number of hits by times at bat for each member of the team.
2. Plan functions to show the total times at bat for the team, total hits for the team, the team batting average, and the highest average for a player.
3. Make a template with headings, column formatting, the macro, and functions.
4. Enter the data (as listed below).
5. Invoke the macro.
6. Print a report of the results.
7. Graph the batting averages.

Data for spreadsheet

Name	Games	At Bat	Hits
Anderson	2	4	1
Baker	1	3	1
Bell	4	6	1
Day	21	62	17
DeVille	2	3	0
Dudley	7	22	4
Gould	21	60	19
Grieske	21	65	15
Guerra	3	5	2
Jackson	8	25	8
Jones	21	70	24
Kelly	6	9	2
King	21	67	16
Martinez	19	55	13
Melton	9	19	6
Phillips	21	67	20
Rizzo	21	69	18
Roppino	10	31	8
Tharpe	6	7	1
Wadowski	5	14	3
Werington	20	59	18

COMPETENCY CHECKLIST

ESSENTIAL ELEMENT: 75.87 (e)(3)(B)

The student will be provided opportunities to: apply general capabilities of spreadsheets.

OBJECTIVE:	Students will startup a spreadsheet program, design and use a template, utilize advanced functions of the software, including macros, print and graph commands, and save the results.	MASTERY	NON MASTERY
------------	---	---------	----------------

- | | | | |
|----|---|-------|-------|
| 1. | Plan a spreadsheet and design a template for it. | _____ | _____ |
| 2. | Enter and manipulate data. | _____ | _____ |
| 3. | Write and use a simple macro. | _____ | _____ |
| 4. | Demonstrate some advanced mathematical functions. | _____ | _____ |
| 5. | Print and graph the results, and save the spreadsheet template. | _____ | _____ |
| | | _____ | _____ |
| | | _____ | _____ |

STUDENT NAME _____

UNIT WILL BE PREPARED DURING THE 1988-89 PROJECT YEAR

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SECTION IV
INFORMATION MANAGEMENT

ESSENTIAL ELEMENT

75.87 (e)(4)

Concepts and skills related to database management.

The student will be provided opportunities to:

- A. demonstrate basic database concepts, procedures, and capabilities; and
- B. apply general capabilities of database management.

SUGGESTED UNIT LESSON PLAN

SECTION IV: INFORMATION MANAGEMENT

UNIT I: CONCEPTS OF INFORMATION MANAGEMENT

ESSENTIAL 75.87
ELEMENT: (e)(4)(A)

ALLOCATED
TIME: 10 Hours

UNIT OBJECTIVE: Students will describe the capabilities of database management software using appropriate terms, and will show how these capabilities are implemented within a software package. He/she will also contrast types of database structures and features of software.

STUDENT
OBJECTIVES:

After completing this unit, the student will be able to:

1. Use terms associated with database management systems
2. Explain the purpose and benefits of databases
3. List typical capabilities of database management software
4. Describe three types of database structures
5. Discuss criteria for comparing software packages

FOCUS:

Almost all organizations maintain a database of some type. Workers who manage or interact with the database, beyond simple data entry, are expected to have an overall understanding of the concepts and organization of the software. Trained employees are expected to be familiar with the common elements that are seen in all DBMS programs.

DOMAINS:

Activities and competency tests have been designed to provide learning experiences utilizing the affective, cognitive, and/or psychomotor domains.

BASIC SKILLS:

Activities and competency tests have been designed to reinforce the basic skills of reading, writing, and/or mathematics.

CONTENT OUTLINE

- I. Concepts of database management
 - A. Decreasing repetitive work
 - B. Increasing accuracy
 - C. Eliminating inaccurate data
 - D. Increasing efficiency
- II. Advantages and disadvantages
 - A. Advantages
 - B. Disadvantages
- III. Applications
 - A. Accounting
 - B. Agriculture
 - C. Construction
 - D. Financial
 - E. Medical
 - F. Real estate
 - G. Sports
 - H. Miscellaneous
- IV. Data logical models
 - A. Hierarchical or tree structure
 - B. Network or plex
 - C. Relational
- V. Comparison of database systems
 - A. Hierarchical
 - B. Network
 - C. Relational
- VI. Capabilities of databases
 - A. Add or enter
 - B. Update or edit
 - C. Delete
 - D. Sort or arrange
 - E. Copy
 - F. Search or index
 - G. Query
 - H. Select
 - I. Project
 - J. Report
- VII. Comparison of software packages
 - A. Capacity
 - B. Input formatting
 - C. Report formats
 - D. Sorting
 - E. Reorganizing
 - F. Ease of use

SUGGESTED TEACHER ACTIVITIES

General Teacher Preparations

1. Preview the unit and review objectives.
2. Decide on a variety of instructional methods to present the unit.
3. Prepare questioning techniques and closure statements.
4. Make modifications in curriculum for special needs students.
5. Consult several alternative sources to enhance and update your knowledge of the current trends, issues, and processes related to the unit content.
6. Select exercises, drills, and other resources to use as supplemental materials for the unit.
7. Secure and prepare sufficient quantities of software backup diskettes for student use.
8. When appropriate, take a field trip or have a guest speaker present a portion of the unit describing industry standards.
9. Prepare appropriate bulletin boards and transparencies.
10. Make copies of appropriate handouts, activities, and test materials.
11. Secure overhead projector, LCD computer panel for data projection, and an appropriate screen.

General Classroom Preparations

1. Secure the students' attention.
2. Communicate learning expectations--goal(s) to be accomplished.
3. Emphasize the value/importance of the unit content or activity.
4. Relate unit content to prior or future learning.
 - a. Use discussions and pretests to determine prior knowledge of the unit content.
 - b. From the results of the discussions and pretests, modify your teaching plans to fit student needs.
 - c. Use enthusiasm, and relate the content to the student's interests.

Reteach Activities

1. Use a new method to reteach a unit activity.
2. Using additional resources, create individualized materials for the more and less capable students.
3. Utilize those sections of tests which need additional reinforcement.
4. Utilize unit activities not previously used.
5. Use peer practice for the reteaching of terminology--one student asks about the meaning of a word. The other student has the list of answers (words). Hints will be given until the word is matched with its correct definition.

Specific Teaching Activities

1. Become familiar with information management software.
2. Obtain sample formats of management manual examples, electronically-produced management examples, and information software brochures.
3. Prepare transparencies to illustrate the command categories that are common to databases.
4. Select assignments or prepare additional assignments to reinforce work within a database.
5. Develop a list of database examples, including some to which students could relate.
6. Make printouts and/or transparencies of sample databases.
7. Identify reference manual sections that will be useful to the students.
8. Select exercises and drills from resources to complete the section.
9. Duplicate data diskettes with predesigned formats to use for exercises.

Activity Five

- Project 1 Gather current literature on database software.

ANSWERS TO ACTIVITIES

Activity One

1. Database Management System--Software that allows the user to access and manipulate data stored in a database.
2. Relation--A connection established between multiple files within a database.
3. Attribute--A descriptive characteristic of hardware, such as the monitor.
4. Key field--A field that can be used for sorting or indexing.
5. Default--The automatic value of an option if the user does not specify a choice.
6. Field--An individual data item in a record.
7. File--A collection of related information. A set of data records.
8. Record--A group of related fields, treated as a unit.
9. Truncate--To drop or cut off characters in a field to make it a certain length.
10. Encrypt--To encode data so that it is unreadable by unauthorized persons.
11. Index--A file that relates a key field to a record number.
12. Schema--A map of the logical structure of a database.
13. Query--A request to the database for specific data.
14. Logical operator--An operator such as AND or OR, that is used to relate logical expressions.
15. Prompt--A symbol or word to inform the user that a response is needed.

Activity Two

Project 1 The objectives around which databases were designed are decreasing repetitive work and increasing accuracy and efficiency of data management.

Project 2 Any ten (10) of the following or others:

1. Accounting: payroll, invoicing, general ledger, accounts payable, and accounts receivable
2. Agriculture: farm accounting, cattle management, dairy management, and acreage management
3. Construction: estimating, job costing, bid management, and project management
4. Financial: inventory control, lease management, financial reports, and cash management
5. Medical: dental and doctor office, hospital administration, nursing home management, and pharmacy management
6. Real estate: property management, mobile park management, property listings, and escrow accounting
7. Sports: baseball, football, basketball statistics programs, racehorse handicaps, and drafting
8. Miscellaneous: personnel management system, travel agency management, food service management, and scientific computations

Project 3 Evaluated to the satisfaction of the instructor.

Activity Three

Project 1 Five of the following:

1. Add or enter--This function is used to load data into a file through entries to a format or schemas.
2. Update or edit--This function is used to change records that already are part of a file.
3. Delete--Obsolete records can be removed from the database.
4. Sort or arrange--This function arranges records within a single file in sequence.
5. Copy--Files or records in a database can be copied to another file or to another place within the database, if desired.
6. Search or index--This function creates an index used to find records within a file.
7. Query--If a particular item of information is needed, such as the balance due on a certain account, the key field (the account number) could be entered and the data relevant to that account displayed on the screen.
8. Select--This function copies complete records or rows into a working file, leaving the existing file undisturbed.
9. Project--This function is similar to select, except that selection and copying are completed for columns of data items, rather than rows.
10. Report--Whatever information is needed after being selected and rearranged to suit the purpose, is then formatted into a report to send off to interested parties.

Project 2 Evaluated to the satisfaction of the instructor.

Activity Four

1. Hierarchical or tree structure--Data is stored something like a family tree in a top-down order, according to established relationships. All access begins at top-level items and preceeds downward. Fields must be accessed through a key field in a "parent" record.
2. Network or plex--Uses structure similar to that of the hierarchical mode, except that access is possible at multiple levels. Data is accessed through key fields, but there are additional pathways, instead of a single one, to access certain data. Data items can have both top-down and bottom-up relationships with a network structure.
3. Relational--A traditional-type file that consists of records and fields. This type of database is composed of tables of data, logically arranged in rows and columns. There can be several of these tables within a database.

Activity Five

- Project 1
1. Capacity
 2. Input formatting
 3. Report formats
 4. Sorting
 5. Reorganizing
 6. Ease of use

- Project 2 Recommendation will vary according to the software used. Evaluated to the satisfaction of the instructor.

COMPETENCY TEST ANSWERS

Part 1

- | | | | |
|------|-------|-------|-------|
| 1. F | 6. T | 11. T | 16. F |
| 2. T | 7. T | 12. F | 17. T |
| 3. T | 8. T | 13. T | 18. T |
| 4. F | 9. F | 14. F | 19. F |
| 5. F | 10. T | 15. T | 20. T |

Part 2

1. The objectives which databases were designed for are decreasing repetitive work and increasing accuracy and efficiency of data management.
2. Any five of the following or others:
 - A. Accounting: payroll, invoicing, general ledger, accounts payable, and accounts receivable
 - B. Agriculture: farm accounting, cattle management, dairy management, and acreage management
 - C. Construction: estimating, job costing, bid management, and project management
 - D. Financial: inventory control, lease management, financial reports, and cash management
 - E. Medical: dental and doctor office, hospital administration, nursing home management, and pharmacy management
 - F. Real estate: property management, mobile park management, property listings, and escrow accounting
 - G. Sports: baseball, football, basketball statistics programs, racehorse handicaps, and drafting
 - H. Miscellaneous: personnel management system, travel agency management, food service management, and scientific computations

Part 3

Five of the following:

1. Add or enter--This function is used to load data into a file through entries to a format or schemas.
2. Update or edit--This function is used to change records that already are part of a file.
3. Delete--Obsolete records can be removed from the database.
4. Sort or arrange--This function arranges records within a single file in sequence.
5. Copy--Files or records in a database can be copied to another file or to another place within the database, if desired.
6. Search or index--This function creates an index used to find records within a file.
7. Query--If a particular item of information is needed, such as the balance due on a certain account, the key field (the account number) could be entered and the data relevant to that account displayed on the screen.
8. Select--This function copies complete records or rows into a working file, leaving the existing file undisturbed.
9. Project--This function is similar to select, except that selection and copying are completed for columns of data items, rather than rows.
10. Report--Whatever information is needed after being selected and rearranged to suit the purpose, is then formatted into a report to send off to interested parties.

Part 4

Project 1

1. Relational
2. Hierarchical
3. Relational
4. Hierarchical
5. Network
6. Hierarchical
7. Network
8. Field
9. Relational
10. Hierarchical

Project 2 Evaluated to the satisfaction of the instructor.

Part 5

Any four of the following:

1. Capacity
2. Input formatting
3. Report formats
4. Sorting
5. Reorganizing
6. Ease of use

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SUGGESTED UNIT LESSON PLAN

SECTION IV: INFORMATION MANAGEMENT

UNIT II: INFORMATION MANAGEMENT APPLICATIONS

**ESSENTIAL 75.87
ELEMENT: (e)(4)(B)**

**ALLOCATED
TIME: 15 Hours**

UNIT OBJECTIVE: Students will create and set up a database, enter data, sort and search the database, and design and print summaries and reports.

**STUDENT
OBJECTIVES:**

After completing this unit, the student will be able to:

1. Create a database
2. Design and edit input and report forms
3. Enter and manipulate data
4. Query the database
5. Use selection criteria for printing reports

FOCUS:

The difference between classroom work and production work is often just a matter of practice and the ability to work independently (or with a minimum of supervision). When competing for a job, this difference could determine which applicant is accepted. Some DBMS programs have become so popular that persons trained in their use are in high demand in many locales. Even training with an infrequently-used program is valuable because it is relatively easy to learn another package after achieving proficiency with one.

DOMAINS:

Activities and competency tests have been designed to provide learning experiences utilizing the affective, cognitive, and/or psychomotor domains.

BASIC SKILLS:

Activities and competency tests have been designed to reinforce the basic skills of reading, writing, and/or mathematics.

CONTENT OUTLINE

- I. Creating a database--System specifications
- II. Forms design
 - A. Input forms
 - B. Report forms
 - C. Field formatting
- III. Setup procedures
- IV. Forms manipulating
- V. Other features
- VI. Entering/manipulating data
 - A. Design of input form
 - B. Changing the input form
- VII. Searches
- VIII. Creating report summaries
- IX. Printing
- X. Importation of data

SUGGESTED TEACHER ACTIVITIES

General Teacher Preparation

1. Preview the unit and review objectives.
2. Decide on a variety of instructional methods to present the unit.
3. Prepare questioning techniques and closure statements.
4. Make modifications in curriculum for special needs students.
5. Consult several alternative sources to enhance and update your knowledge of the current trends, issues, and processes related to the unit content.
6. Select exercises, drills, and other resources to use as supplemental materials for the unit.
7. Secure and prepare sufficient quantities of software backup diskettes for student use.
8. When appropriate, take a field trip or have a guest speaker present a portion of the unit describing industry standards.
9. Prepare appropriate bulletin boards and transparencies.
10. Make copies of appropriate handouts, activities, and test materials.
11. Secure overhead projector, LCD computer panel for data projection, and an appropriate screen.

General Classroom Preparations

1. Secure the students' attention.
2. Communicate learning expectations--goals to be accomplished.
3. Emphasize the value/importance of the unit content or activity.
4. Relate unit content to prior or future learning.
 - a. Use discussions and pretests to determine prior knowledge of the unit content.
 - b. From the results of the discussions and pretests, modify your teaching plans to fit student needs.
 - c. Use enthusiasm, and relate the content to the student's interests.

Reteach Activities

1. Use a new method to reteach a unit activity.
2. Using additional resources, create individualized materials for the more and less capable students.
3. Utilize those sections of tests which need additional reinforcement.
4. Utilize unit activities not previously used.
5. Use peer practice for the reteaching of terminology--one student asks about the meaning of a word. The other student has the list of answers (words). Hints will be given until the word is matched with its correct definition.

BCAI/Information Management/Information Mgt. Applications/LESSON PLAN

Specific Teaching Activities

1. Become familiar with information management software.
2. Obtain sample formats of management manual examples, electronically-produced management examples, and information software brochures.
3. Prepare transparencies to illustrate the command categories that are common to databases.
4. Select assignments or prepare additional assignments to reinforce work within a database.
5. Develop a list of database examples, including some to which students could relate.
6. Make printouts and/or transparencies of sample databases.
7. Identify reference manual sections that will be useful to the students.
8. Select exercises and drills from resources to complete the section.
9. Duplicate data diskettes with predesigned formats to use for exercises.

Activity One Gather information about schedules.

Activity Two

Project 1 Assign groups and gather ideas for databases.

Project 2 Prerequisite -- Project 1

Activity Three Prerequisite -- Activity One

Activity Four Prerequisites -- Activity One and Activity Three

Activity Five Prerequisite -- Activity One and Activity Three

ANSWERS TO ACTIVITIES

Activity One Evaluated to the satisfaction of the instructor.

Activity Two

Projects 1 and 2 Evaluated to the satisfaction of the instructor

Activity Three Evaluated to the satisfaction of the instructor.

Activity Four

Project 1

- | | | | |
|----|---|--------|-----|
| 1. | COMPUTER MATH | REED | 315 |
| 2. | TENNIS | THOMAS | GYM |
| 3. | NO | | |
| 4. | DONNA CATE
MIKE KOWACK
AMY NOLES
CHRIS TALLER
TODD WEST | | |
| 5. | BRANNON BELL
MIKE HILL
BRYAN KING
CHRIS TALLER
JIM TODDLER
TODD WEST | | |

BCAI/Information Management/Information Management Applications/ANSWERS

Activity Five

Evaluated to the satisfaction of the instructor. However, the information on the report should contain the following entries.

Report 1	Bell Brannon	11	Neer
	Bell Tommy	9	Neer
	Cate Donna	12	Neer
	Coffee Chanda	11	Neer
	Davis Jared	10	Neer
	Gile Jimmie	12	French
	Hill Mike	9	French
	Hull Kim	10	French
	Jones Wendy	10	French
	King Bryan	11	French
	Kowack Mike	12	French
	Noles Amy	12	Brown
	Norman Jenny	9	Brown
	Rowe Jeff	9	Brown
	Steel Justin	10	Brown
	Taller Chris	12	Hunt
	Toddler Jim	9	Hunt
	West Todd	12	Hunt
Report 2	Donna Cate		
	Jimmie Gile		
	Mike Kowack		
	Amy Noles		
	Chris Taller		
Report 3	Taller Chris		
	West Todd		
Report 4	STUDENT:	JEFF ROWE	
	ADVISOR'S #:	303	
	GRADE:	9	
	COUNSELOR:	BROWN	
	SCHEDULE:		
	0	NONE	
	1	ENGLISH I	FIELDS 201
	2	PHY SCIENCE	MEAKER 102
	3	TX HISTORY	COTTS 411
	4	ALGEBRA I	ROBERTS 313
	5	CHOIR	TALLEY 513
	6	WOODWORKING	HOWL 110
Report 5	CATE DONNA		
	GILE JIMMIE		
	KOWACK MIKE		
	NOLES AMY		
	TALLER CHRIS		
	WEST TODD		

COMPETENCY TEST ANSWERS

Evaluated to the satisfaction of the instructor.

TERMINOLOGY

Alphanumeric	Data items which may contain digits, letters, or special characters.
Appending	Adding records to an existing database file. Many databases handle this common task differently.
Ascending sequence	Arranged in order from lowest to highest, (or alphabetically from A to Z).
Boolean Logic	Based on the algebraic logic developed by George Boole, this logic system uses such operators as AND, OR, and NOT for searching and sorting records.
Category	A class of data such as a name, date, cost, or part number (a field).
Create	Establishing the records and fields to be used in a database.
Criteria	The rules used for selecting records from the database.
Database	A collection of data relating to a subject, organized to make information accessible for a variety of needs.
Database management system (DBMS)	The most sophisticated type of database program which should be distinguished from a file manager or filing program.
Delete	To remove a record from a file.
Descending sequence	Arranged in order from highest to lowest (or alphabetically from Z to A).
Field	A subdivision of a record. An item of data within a record.
File	A set of related records stored together.
File manager	A common form of database program, more powerful than a simple filing program, but less flexible and powerful than a true database management system.
Find	See search.
Hierarchical structure	In the form of a tree.
Index	A value which points to or counts records in a file or list.
Key	A field or category within a record that is used to identify, select, or sort records.
Logical expressions	Allow complex retrievals to be made through logical operators AND, OR, and NOT.

BCAI/Information Management/TERMINOLOGY

Plex structure	In the form of a network at multiple levels.
Query language	A high-level, English-like language used with databases to make requests.
Record	One or more related items of data stored as a unit.
Relational	A database made up of files that consist of records and fields.
Search (Find)	To look for all records that meet a set of criteria.
Select	To choose records from a file according to rules or criteria.
Sort	To arrange records according to a predetermined sequence.

TEXTBOOKS

APPLEWORKS TUTORIAL
Apple Computer Co.

THE ART OF USING COMPUTERS
Boyde and Fraser Publishing Co.

*COMPUTER FUNDAMENTALS IN THE
INFORMATION AGE*
Anaheim Publishing Co.

DATABASE APPLICATIONS
South-Western Publishing Co.

ELECTRONIC OFFICE PROCEDURES
Gregg Division/McGraw-Hill Book Co.

*INFORMATION PROCESSING CONCEPTS,
PRINCIPLES, AND PROCEDURES*
South-Western Publishing Co.

INFOSTAR TUTORIAL
Craven Publishing Co.

*INTEGRATED SOFTWARE PRINCIPLES AND
APPLICATIONS USING LOTUS 1-2-3*
Gregg Division/McGraw-Hill Book Co.

THE LOTUS GUIDE TO LEARNING 1-2-3
Addison Wesley Publishing Co.

OFFICE SYSTEMS AND PROCEDURES
Houghton Mifflin Co.

PRACTICE SETS

*APPLEWORKS - INTEGRATED APPLICATIONS
FOR MICROCOMPUTERS*
South-Western Publishing Co.

*APPLICATIONS USING THE PERSONAL
COMPUTER*
South-Western Publishing Co.

*APPLICATIONS USING THE PERSONAL
COMPUTER*
Gregg Division/McGraw-Hill Book Co.

COMPUTERIZED INVENTORY PROCEDURES
South-Western Publishing Co.

*GIFTIQUE: AN INFORMATION MANAGEMENT
WORKFLOW*
Integrated Business Simulation
South-Western Publishing Co.

MICROCOMPUTER SIMULATION IN BUSINESS
South-Western Publishing Co.

SNOWDRIFT ICE CREAM
Gregg Division/McGraw-Hill Book Co.

TRONICS, INC.
South-Western Publishing Co.

*WORD PROCESSING CONCEPTS AND
APPLICATIONS*
Gregg Division/McGraw-Hill Book Co.

SOFTWARE

APPLEWORKS
Apple Computer Co.

DBASE III +
Ashton-Tate Publishing Co.

ELECTRIC DESK
Alpha Software

FILING ASSISTANT INSTRUCTIONAL MODULE
Pass Publications

FRAMEWORK II
Ashton-Tate Publishing Co.

IBM FILING ASSISTANT
IBM Personal Computer Division

INFOSTAR
MicroPro International Corp.

JAZZ
Lotus Development Corp.

LOTUS 1-2-3
Lotus Development Corp.

MICROSOFT WORKS
Microsoft

OPEN ACCESS

Software Products International

PFS: FILE AND REPORT

Software Publishing Corp.

QUICK FILE II

Apple Computer Co.

WRITING ASSISTANT

IBM Personal Computer Division

REFERENCES

ADVANCED DBASE III PLUS

Miriam Lishin

Borland, Osborne, and MicroPro

McGraw-Hill Publishers

DBASE III PLUS MADE EASY

Miriam Lishin

Borland, Osborne, and MicroPro

McGraw-Hill Publishers

DBASE III PLUS: THE COMPLETE REFERENCE

Miriam Lishin

Borland, Osborne, and MicroPro

McGraw-Hill Publishers

DBASE III: TIPS AND TRAPS

Dick Anderson, Cynthia Cooper, Bill Ramsey

Borland, Osborne, and MicroPro

McGraw-Hill Publishers

PFS PROFESSIONAL FILE

Walter A. Ettlin

Borland, Osborne, and MicroPro

McGraw-Hill Publishers

USING DBASE III PLUS

Ed Jones

Borland, Osborne, and MicroPro

McGraw-Hill Publishers

USING REFLEX: THE DATABASE MANAGER

Stephen Cobb

Borland, Osborne, and MicroPro

McGraw-Hill Publishers

ADDITIONAL SOFTWARE SOURCES

APPLICATIONS USING THE PC

South-Western Publishing Co.

COMPUTER APPLICATIONS: DATABASE

Educational Activities Inc.

Apple II, IIE, IIC 48k

IBM PC; XT, AT, 128k

DATABASE APPLICATIONS

South-Western Publishing Co.

DATABASE MANAGEMENT SYSTEMS:

AN INTRODUCTION

Educational Activities Inc.

Apple II, IIE, IIC 48k

IBM PC; XT, AT, 128k

DBASE III

Ashton-Tate

IBM PC; XT, AT, 256k

INTRODUCTION TO DATABASE

Learning Arts

IBM PC; XT, AT, 128k

Q&

Symantec

IBM PC; XT, AT, 512k

REFLEX: THE ANALYST

Borland International

IBM PC; XT, AT, 128k

Macintosh, Macintosh +

REFLEX WORKSHOP

Borland International

IBM PC; XT, AT, 128k

Macintosh, Macintosh +

SORTING TECHNIQUES I

J. Weston Walch, Publisher

Apple II, IIE, IIC 48k

SORTING TECHNIQUES II

J. Weston Walch, Publisher

Apple II, IIE, IIC 48k

SECTION IV: INFORMATION MANAGEMENT

UNIT I: CONCEPTS OF INFORMATION MANAGEMENT

UNIT OBJECTIVE:

Students will describe the capabilities of database management software using appropriate terms, and will show how these capabilities are implemented within a software package. He/she will also contrast types of database structures and features of software.

STUDENT OBJECTIVES:

After completing this unit, the student will be able to:

1. Use terms associated with database management systems
2. Explain the purpose and benefits of databases
3. List typical capabilities of database management software
4. Describe three types of database structures
5. Discuss criteria for comparing software packages

GENERALIZATION:

Almost all organizations maintain a database of some type. Workers who manage or interact with the database, beyond simple data entry, are expected to have an overall understanding of the concepts and organization of the software. Trained employees are expected to be familiar with the common elements that are seen in all DBMS programs.

UNIT OVERVIEW

- I. Concepts of database management--The objectives around which databases were designed are decreasing repetitive work and increasing accuracy and efficiency of data management.
 - A. Decreasing repetitive work--The idea is that data, once entered, need not ever be entered again. For example, an employee's birthdate is needed for several different reports by different departments within the company, each department can access the database rather than obtain the information separately.
 - B. Increasing accuracy--If a number is typed twenty times by twenty different people, chances are that one or more of them will type it incorrectly, particularly when large quantities of data are being dealt with. Humans are subject to many factors, such as fatigue, which increase the chances of error.
 - C. By entering data just once into a database, and verifying its accuracy immediately, almost all cases of inaccurate data can be eliminated. Of course, if the data isn't verified, and it's wrong, the consequences can be much more serious.
 - D. Increasing efficiency--Because the data is entered only once, and then processed at computer speeds, results are obtained much faster and with fewer intermediate steps.
- II. Advantages and disadvantages of database management systems
 - A. Advantages--These are in addition to those mentioned as the objectives of databases.
 - 1. If new needs arise, the data is already there.
 - 2. Updating of a record need only be done once.
 - 3. All occurrences of a record can be deleted at one time.
 - 4. Managed correctly, the system is reliable.
 - 5. Multiple users can work with the database from different locations.
 - 6. Integrated files allow an overview of the user's business and improve access to data.
 - 7. Having the data in a centralized location allows better security.
 - B. Disadvantages
 - 1. Errors, if not corrected, are perpetuated.
 - 2. The owner of the data can lose control over it.

3. Only one user can access a file (for change) at one time.
4. Privacy can be compromised.

III. Applications--Typical database management applications include:

- A. Accounting: payroll, invoicing, general ledger, accounts payable, and accounts receivable
- B. Agriculture: farm accounting, cattle management, dairy management, and acreage management
- C. Construction: estimating, job costing, bid management, and project management
- D. Financial: inventory control, lease management, financial reports, and cash management
- E. Medical: dental and doctor office, hospital administration, nursing home management, and pharmacy management
- F. Real estate: property management, mobile park management, property listings, and escrow accounting
- G. Sports: baseball, football, basketball statistics programs, racehorse handicaps, and drafting
- H. Miscellaneous: personnel management system, travel agency management, food service management, scientific computations, and many more applications

IV. Data logical models--Database management systems, the programs through which users communicate with the databases, are complex and sometimes expensive. Without these programs, the data would not be convenient to access. DBMS programs are of three structural types.

- A. Hierarchical or tree structure--Data is stored something like a family tree in a top-down order, according to established relationships.
 1. All access begins at top-level items and proceeds downward. Fields must be accessed through a key field in a "parent" record.
 2. For example, if a business is organized by department, the only way to look at the record of an employee in a department is through the department parent record. The key field might be "Employee name." Each employee record might, in turn, be a parent to another record, which could be accessed through the name as the key field.

- B. Network or plex--Uses structure similar to that of the hierarchical mode, except that access is possible at multiple levels.
 - 1. Data is accessed through key fields, but there are additional pathways, instead of a single one, to access certain data.
 - 2. Data items can have both top-down and bottom-up relationships with a network structure.
 - 3. For example, a person could be accessed using a social security number as a key, in addition to the department number.
 - C. Relational--This is a traditional-type file that consists of records and fields.
 - 1. This type of database is composed of tables of data, logically arranged in rows and columns. There can be several of these tables within a database.
 - 2. These tables are each built separately, but can have fields in common. The common fields can be used to relate data from one file to that in another so that a report could be made up of data from two or more files.
 - 3. Some software (examples are AppleWorks and LOTUS 1-2-3) use a relational structure and provide excellent speed. Because they can only operate while residing entirely in memory, the size of the database is limited by the amount of main memory.
- V. Comparison of database systems--Each type has advantages and disadvantages.
- A. Hierarchical
 - 1. Advantage--fastest to access data
 - 2. Disadvantages--least flexible, limited ability to sort and rearrange data
 - B. Network
 - 1. Advantages--more flexible than hierarchical, some relationships can be made
 - 2. Disadvantage--slower access than a hierarchical database
 - C. Relational
 - 1. Advantages--Most flexible, easy to adapt to new uses, more relationships possible
 - 2. Disadvantage--slowest access

- VI. Capabilities of databases--Much more can be done than merely enter data, store it, and then print it out later. The programs called Database Management Systems (DBMS) provide numerous functions and ways to manipulate the data.
- A. Add or enter--This function is used to load data into a file through entries to a format or schemas. Some databases do not permit changing the structure once it has been established and data entered, but all permit adding more records. Indeed, appending data to a file is one of the most frequent activities.
 - B. Update or edit--This function is used to change records that already are part of a file. Sometimes records are to remain in the database, but part of the information has changed (a new address or phone number, for example). The new information is entered and replaces the old.
 - C. Delete--Obsolete records can be removed from the database. When the command is given to remove a record, it is not physically erased, but its space is made available for new data and its record number is reassigned. Periodically, the whole file can be recopied. At that time the deleted files are actually erased.
 - D. Sort or arrange--This function arranges records within a single file in sequence. The data that is entered usually remains in the same order once it is stored. For a report, the order of the data to be printed can be organized in any desired order, sequenced, and grouped by two or more fields (alphabetically, within a division, for example). Name would be the secondary sort key and division would be the primary. To actually change the way the data is stored, the data would be recopied to the disk as another file, and data would not have to be retyped.
 - E. Copy--Files or records in a database can be copied to another file or to another place within the database, if desired.
 - F. Search or index--This function creates an index used to find records within a file. Using whatever keys are available, the database can be searched to find one or all occurrences of specified data. In this way, for example, one could find if there are persons who live in a certain zip code, or if there is merchandise with an expiration date before the current month.
 - G. Query--If a particular item of information is needed, such as the balance due on a certain account, the key field (the account number) could be entered and the data relevant to that account displayed on the screen.
 - H. Select--This function copies complete records or rows into a working file, leaving the existing file undisturbed. The database may contain many thousands of records, but if we are only interested in those for people who have type O blood and are between ages 18 and 65, for example, we can select for those criteria without having to read every record.
 - I. Project--This function is similar to select, except that selection and copying are completed for columns of data items, rather than rows.
 - J. Report--Whatever information is needed after being selected and rearranged to suit the purpose, is then formatted into a report to send off to interested parties.

VII. Comparison of software packages--While all packages have the same basic purposes, there is a wide difference in the way they are implemented. Several factors can be considered.

A. Capacity

1. Maximum number of records
2. Maximum number of fields per record
3. Maximum size of a record
4. Total capacity of database in bytes
5. Will it support multiple disk files?

B. Input formatting

1. Is there a separate screen for entering records?
2. Can the input screen be designed by the user?
3. Ease of editing
4. Can fields be duplicated from one record to the next?

C. Report formats

1. Can mailing labels be customized?
2. Can a page be printed for each record?
3. Maximum report size
4. Limitations on arrangement of data

D. Sorting

1. Limitations on fields that can be used
2. How many levels are allowed?

E. Reorganizing

1. Can new fields be added?
2. Can field sizes be changed?
3. Can indices be added?

- F. Ease of use
 - 1. Help subsystem
 - 2. Adequacy of manuals
 - 3. Menus

TERMINOLOGY

INSTRUCTIONS: Define the following information management terms.

1. Database management system -
2. Relation -
3. Attribute -
4. Key field -
5. Default -
6. Field -
7. File -
8. Record -
9. Truncate -
10. Encrypt -
11. Index -
12. Schema -
13. Query -
14. Logical operator -
15. Prompt -

PURPOSE AND BENEFITS OF DATABASES

Project 1

INSTRUCTIONS: Explain the concepts of database management.

Project 2

INSTRUCTIONS: List ten applications for database management.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Project 3

INSTRUCTIONS: Contact two business users and/or others in order to assemble a list of real problems that are being solved with database management. Be sure to check the list and record what businesses are being contacted. This will prevent several students from contacting the same business.

CAPABILITIES OF DATABASE MANAGEMENT SOFTWARE

Project 1

INSTRUCTIONS: List and explain five (5) capabilities of a database management software package.

1.

2.

3.

4.

5.

Project 2

INSTRUCTIONS: Describe or give an example of each of the following database activities.

1. Adding or appending data
2. Deleting a record
3. Updating records
4. Copying or duplicating data
5. Searching a database
6. Querying a database
7. Selecting records
8. Reporting

DATABASE STRUCTURES

INSTRUCTIONS: Describe three types of database structures.

1.

2.

3.

COMPARING DATABASE SOFTWARE

Project 1

INSTRUCTIONS: List the six (6) criteria for comparing database software packages.

1.

2.

3.

4.

5.

6.

Project 2

INSTRUCTIONS: Using current literature and the criteria for comparing database management software packages, select a database package and write a recommendation for that package.

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COMPETENCY TEST

PART I: TERMS

INSTRUCTIONS: Write T if the statement is true, F if the statement is false.

- _____ 1. Databases were developed because handwritten data files are difficult to read.
- _____ 2. The use of databases instead of individual files reduces the amount of repetitive work.
- _____ 3. Data in a database are likely to be more accurate than manually processed data.
- _____ 4. Data in a database is 100% accurate.
- _____ 5. Once data is keyed into a database, there is nothing else that needs to be done to it.
- _____ 6. Data within a database can be sorted alphabetically, numerically, or chronologically, depending on the data.
- _____ 7. Data in a database may be sorted on more than one field.
- _____ 8. At the time a record is deleted, it is not physically removed.
- _____ 9. Once the records have been typed into a database, it is too late to insert more records.
- _____ 10. If data has been incorrectly entered, it can be corrected at any time after the error is discovered.
- _____ 11. A database program allows one to find out how many people with the same last name are in a database file.
- _____ 12. To query a database means to ask for all the data to be displayed or printed.
- _____ 13. A report can be printed containing only data that meets certain specifications.
- _____ 14. An attribute is a type of hardware.
- _____ 15. Chronological order means in order according to time.
- _____ 16. Decrement means an increase in value.
- _____ 17. Error-trapping is used as a check against bad data.
- _____ 18. An index file is one that relates a key field to a record.
- _____ 19. A literal is a type of variable stored in a database.
- _____ 20. A network structure resembles a tree.

PART II: PURPOSE OF DATABASE

1. Explain the purpose and benefits of a database.

2. List five (5) applications in which a database can be used.
 - a.
 - b.
 - c.
 - d.
 - e.

PART III: CAPABILITIES OF DATABASE MANAGEMENT SOFTWARE

INSTRUCTIONS: List and explain five (5) capabilities of database software.

- a.
- b.
- c.
- d.
- e.

PART IV: TYPES OF DATABASE STRUCTURES

Project 1

INSTRUCTIONS: Complete the following statements.

1. The most flexible database structure is _____.
2. A _____ database can access data most quickly.
3. LOTUS 1-2-3 is an example of a _____ structure.
4. The _____ structure is the least flexible.
5. Data items can have both top-down and bottom-up relationships with a _____ structure.
6. The _____ structure has a top-down order.
7. The _____ structure has access at multiple levels.
8. An individual item in a data record is a _____.
9. The _____ structure is composed of tables of logically arranged data in rows and columns.
10. In the _____ structure, fields must be accessed through a key field in a parent record.

Project 2

INSTRUCTIONS: Describe the structure of the database program with which you are working.

PART V: COMPARING SOFTWARE PACKAGES

INSTRUCTIONS: List four (4) criteria areas in which one should compare when evaluating database software packages.

a.

b.

c.

d.

COMPETENCY CHECKLIST

ESSENTIAL ELEMENT: 75.87(e)(4)(A)

The students will be provided opportunities to: demonstrate basic database concepts, procedures, and capabilities.

OBJECTIVE: Students will describe the capabilities of database management software using appropriate terms, and will show how these capabilities are implemented within a software package. He/she will also contrast types of database structures and features of software.

	MASTERY	NON MASTERY
--	---------	----------------

- | | | |
|---|-------|-------|
| 1. Use terms associated with database management systems. | _____ | _____ |
| 2. Explain the purpose and benefits of databases. | _____ | _____ |
| 3. List typical capabilities of database management software. | _____ | _____ |
| 4. Describe three types of database structures. | _____ | _____ |
| 5. Discuss criteria for comparing software packages. | _____ | _____ |
| | _____ | _____ |
| | _____ | _____ |

STUDENT NAME _____

SECTION IV: INFORMATION MANAGEMENT

UNIT II: INFORMATION MANAGEMENT APPLICATIONS

UNIT OBJECTIVE:

Students will create and set up a database, enter data, sort and search the database, and design and print summaries and reports.

STUDENT OBJECTIVES:

After completing this unit, the student will be able to:

1. Create a database
2. Design and edit input and report forms
3. Enter and manipulate data
4. Query the database
5. Use selection criteria for printing reports.

GENERALIZATION:

The difference between classroom work and production work is often just a matter of practice and the ability to work independently (or with a minimum of supervision). When competing for a job, this difference could determine which applicant is accepted. Some DBMS programs have become so popular that persons trained in their use are in high demand in many locales. Even training with an infrequently used program is valuable because it is relatively easy to learn another package after achieving proficiency with one.

UNIT OVERVIEW

I. Creating a database

A. System specifications are designed to guide in creating a database that will be a functional information system. Elements of the system specifications include:

1. Problem definition--is a description of results to be attained. The description should be complete enough to cover all expectations.
2. System flow description--provides a simple system flowchart as a basis for translating the definition statement into a series of events and elements that provide the computer solution.
3. Data structure definition--identifies each field name, data type, and the number of characters to be included in all the fields that make up individual records.
4. Input description--examines documents that will contain source data. The best way to specify input is to work with copies or layouts of all source documents.
5. Processing description--in simple terms, the user should list the processing functions (calculations) that will be applied to file or input records to produce either updated files or output.
6. Output description--depicts formats for presenting information on output documents. Reports and other output can be displayed on screen, or printed on a printer.
7. Test data--a set of data to be processed as a means of determining whether the system will do the job for which it is intended. The test data should contain both valid and erroneous or unacceptable items. If the test data set is designed properly, the valid transactions will test a system to its full capabilities and the invalid items will ensure that the system can deal with entries that require rejection.

II. Forms design

A. Input forms--The form should be designed with the objective of making data entry as smooth and easy as possible. Some considerations are:

1. Source documents--Data to be keyed in (usually on paper). If there has been good planning, these source documents are well arranged and will be easy for a data entry clerk to enter. The screen input form should, if possible, follow the same order as the source document to minimize eye movements and searching.

2. Logical groupings--It is easier to enter data if related fields are continuous on the form. Once again, smooth movements from one field to the next lead to faster and more accurate data entry.
3. Spacing--The screen should be well balanced, not crowded or cluttered. Leave enough space between fields for good visibility, but do not spread them out unnecessarily. The appearance should be as pleasing as possible for the persons who must look at it for long periods of time.
4. Prompts--The words and other characters displayed on the screen should clearly indicate what data is expected, but should be brief. Use consistent abbreviations and punctuation.
5. The software being used controls what options are available to the designer. Some packages give complete freedom of screen design, others give very little. The database portion of LOTUS 1-2-3 requires all data to be entered in spreadsheet format.

B. Report forms--Most reports are classified as either labels or lists.

1. Labels--A form that is designed to print data from an individual record.
 - a. A label can be a single line of print or many lines.
 - b. Many programs also allow the user to specify several labels to be printed side by side.
 - c. The arrangement of data on the labels is entirely up to the user.
2. Lists--Also called page format, this form consists of headings at the top of the page followed by a print line for each record to be included.
 - a. Fields are selected and arranged by the user.
 - b. There are numerous options such as page length and width, printing of page numbers, and line spacing.

C. Field formatting--At the time same fields are named during input design, information about the field must also be given.

1. Data can be classified into several types: alphanumeric, and several numeric options, such as dollar and cents, percentage, fixed decimal, and date.
2. The maximum and minimum field length and whether a field may be left blank are also specified.

III. Setup procedures--Starting up a new database is usually accomplished through menu commands.

- A. The first job is to follow the instructions for creating the input form that has been designed. (Output forms can be created at any time.) Once the form is complete, the program is ready for data entry.
 - B. During subsequent sessions, the first step is to select the database by name, and then follow the menu to bring up the input form or call for other activities. The program takes care of all record keeping, and always knows how many records have been entered.
- IV. Forms manipulation--The program, the data, the paper size, and the printer all play a part in information management applications, and they must be coordinated.
- A. It is common to use special forms with database reports and particularly with label printing.
 - B. Single width labels are referred to as "one up," and quadruple width labels as "four up." When labels are printed, the page length must be set to agree with the label size. When using page format, the paper can be of any size, including longer and wider than the default size.
- V. Other features--After a database has been created, there are a number of features that may be available, depending on the software used.
- A. Data can be edited or appended; the user can view the structure of the database; report forms can be created; or one can scroll through the data, or get on-line help.
 - B. Some programs permit a limited amount of calculation, such as summing a numeric field.
- VI. Entering/manipulating data--Entry is accomplished one record at a time, using an input form. Some software saves each record on a disk as soon as it is entered. Other programs do not save any records until the user terminates the entry session. Any field of a record can be edited while the record remains on the screen.
- A. The design of the input form determines what data can be entered into a field. If a field has been identified as a date, then characters which cannot be part of a date will not be accepted.
 - 1. Error traps are built in. If the user attempts to type invalid data, a message will be displayed.
 - 2. This feature cannot catch all types of errors, but can catch errors where the data is out of range or of the wrong type.
 - 3. Data will not be accepted if it is longer than the field. Most programs display an error message, others will truncate.
 - B. Once data has been entered, most databases will not allow changing the input form. If changes must be made (for example, to expand a field), a new database can be created, and the records copied from the old database to the new.

- VII. Searches--Searching for specific records is accomplished through commands such as Find, Seek, or Locate.
 - A. The general procedure is to list the criteria that will identify the desired record(s) as part of the command. Three or even more criteria may be listed. A search criterion can be exact (Name = 'Mickey Mouse'), or a range (Zipcode > 75000). If there are multiple criteria, they are joined with the logical operators, AND, OR, NOT.
 - B. The search can stop with the first record that meets the criteria, or continue searching for all occurrences.
- VIII. Creating report summaries--An output form is used for a summary.
 - A. Any number of output forms can be designed for the same database. They are stored by name on the disk. If a new report is requested, a new report can be designed.
 - B. Only the desired fields need be included on the form. The data records for the report are then selected by searching, unless all records are to be printed.
- IX. Printing--Select Print from the menu. Printer options may be selected earlier and saved with the form. Enter the name of the file to be printed, mount the correct forms on the printer, adjust the top of the form, and enter the command to commence printing.
- X. Some software permits data from other programs to be imported into the database. The techniques vary, but in general, the records of the receiving file should be designed with the same fields and order, as those of the sending file. Data can also be exported. The reference manual or menu options usually list the names of programs from which data can be imported. Unless the program being used specifically lists the other program for import or export, the results are unpredictable.

CREATE A DATABASE

INSTRUCTIONS: Plan and create a database for student schedules. The input form should look like the one below:

STUDENT SCHEDULE

Student: _____

Advisor's #: _____

Grade: _____

Counselor: _____

PERIOD	COURSE	TEACHER	ROOM #
0			
1			
2			
3			
4			
5			
6			

DESIGN A DATABASE

Project 1

INSTRUCTIONS: Work in groups to design a useful information management system. Each group will need to follow the seven (7) system specifications.

- 1) Write a problem definition.
- 2) Draw a simple system flowchart.
- 3) List the data structures.
- 4) Describe and/or develop input forms.
- 5) Write out the processing needed.
- 6) Describe and/or develop one (1) screen report and three (3) printed reports (out put).
- 7) Develop test data.

Project 2

INSTRUCTIONS: Enter data into the database your group developed in Project 1.

ENTER AND MANIPULATE DATA

INSTRUCTIONS: Enter the following data in the database developed in Project 1.

STUDENT: TODD WEST

ADVISOR'S #: 218

GRADE: 12

COUNSELOR: HUNT

SCHEDULE:

0	NONE		
1	GOVERNMENT	ROGERS	410
2	ENGLISH IV	HARDEN	210
3	COMP APPL	JONES	111
4	BUS MANG	WALKER	211
5	TENNIS	THOMAS	GYM
6	STUDY HALL	KILE	500

STUDENT: CHRIS TALLER

ADVISOR'S #: 218

GRADE: 12

COUNSELOR: HUNT

SCHEDULE:

0	GOVERNMENT	ROGERS	410
1	ADV DRAFTING	HOOPER	108
2	ENGLISH IV	HARDEN	210
3	COMP APPL	JONES	111
4	BUS MANG	WALKER	211
5	ARCH DRAFTING	HOOPER	108
6	STUDY HALL	KILE	500

STUDENT: CHANDA COFFEE

ADVISOR'S #: 112

GRADE: 11

COUNSELOR: NEER

SCHEDULE:

0	NONE		
1	WORLD HISTORY	DAWSON	412
2	ENGLISH III	ROSS	214
3	ALGEBRA II	ROSEN	314
4	TYPING	BELL	212
5	STUDY HALL	KILE	500
6	TRACK	MEAKER	GYM

BCAI/Information Management/Info. Mgt. Applications/ ACTIVITY THREE (Continued)

STUDENT: JIMMIE GILE

ADVISOR'S #: 216

GRADE: 12

COUNSELOR: FRENCH

SCHEDULE:

0	GOVERNMENT	ROGERS	410
1	ENGLISH IV	HARDEN	210
2	CHEMISTRY	HONAKER	106
3	COMPUTER MATH	REED	315
4	BUS MANG	WALKER	211
5	STUDY HALL	KILE	500
6	TRACK	HARRIS	GYM

STUDENT: BRYAN KING

ADVISOR'S #: 108

GRADE: 11

COUNSELOR: FRENCH

SCHEDULE:

0	NONE		
1	WORLD HISTORY	DAWSON	412
2	ENGLISH III	BASTON	202
3	COMPUTER MATH	REED	315
4	TYPING	BELL	212
5	BIOLOGY	HOWL	101
6	STUDY HALL	KILE	500

STUDENT: BRANNON BELL

ADVISOR'S #: 112

GRADE: 11

COUNSELOR: NEER

SCHEDULE:

0	NONE		
1	FOOTBALL	HUEY	GYM
2	ALGEBRA	ROSEN	314
3	WORLD HISTORY	DAWSON	412
4	COMPUTER MATH	REED	315
5	ARCH DRAFTING	HOOVER	108
6	STUDY HALL	KILE	500

BCAI/Information Management/Info. Mgt. Applications/ ACTIVITY THREE (Continued)

STUDENT: JIM TODDLER

ADVISOR'S #: 302

GRADE: 9

COUNSELOR: HUNT

SCHEDULE:

0	NONE		
1	ENGLISH I	FIELDS	201
2	PHY SCIENCE	MEAKER	102
3	TX HISTORY	COTTS	411
4	ALGEBRA I	ROBERTS	313
5	BAND	JONES	512
6	STUDY HALL	KILE	500

STUDENT: TOMMY BELL

ADVISOR'S #: 301

GRADE: 9

COUNSELOR: NEER

SCHEDULE:

0	NONE		
1	PHY SCIENCE	MEAKER	102
2	ENGLISH I	FIELDS	201
3	ALGEBRA I	ROBERTS	313
4	STUDY HALL	KILE	500
5	BAND	JONES	512
6	TX HISTORY	COTTS	411

STUDENT: JENNY NORMAN

ADVISOR'S #: 302

GRADE: 9

COUNSELOR: BROWN

SCHEDULE:

0	NONE		
1	ENGLISH I	FIELDS	201
2	PHY SCIENCE	MEAKER	102
3	TX HISTORY	COTTS	411
4	ALGEBRA I	ROBERTS	313
5	CHOIR	TALLEY	513
6	ART I	NEEL	515

BCAI/Information Management/Info. Mgt. Applications/ ACTIVITY THREE (Continued)

STUDENT: MIKE HILL

ADVISOR'S #: 301

GRADE: 9

COUNSELOR: FRENCH

SCHEDULE:

0	NONE		
1	ENGLISH I	FIELDS	201
2	PHY SCIENCE	MEAKER	102
3	TX HISTORY	COTTS	411
4	ALGEBRA I	ROBERTS	313
5	BAND	JONES	512
6	STUDY HALL	KILE	500

STUDENT: JEFF ROWE

ADVISOR'S #: 303

GRADE: 9

COUNSELOR: BROWN

SCHEDULE:

0	NONE		
1	ENGLISH I	FIELDS	201
2	PHY SCIENCE	MEAKER	102
3	TX HISTORY	COTTS	411
4	ALGEBRA I	ROBERTS	313
5	CHOIR	TALLEY	513
6	WOODWORKING I	HOWL	110

STUDENT: KIM HULL

ADVISOR'S #: 402

GRADE: 10

COUNSELOR: FRENCH

SCHEDULE:

0	NONE		
1	VOLLEYBALL	HATCH	GYM
2	AM HISTORY	HENLEY	414
3	ENGLISH	CAGLE	203
4	STUDY HALL	KILE	500
5	TYPING	JOHNSON	212
6	ALGEBRA I	ROBERTS	313

BCAI/Information Management/Info. Mgt. Applications/ ACTIVITY THREE (Continued)

STUDENT: WENDY JONES

ADVISOR'S #: 400

GRADE: 10

COUNSELOR: FRENCH

SCHEDULE:

0	NONE		
1	VOLLEYBALL	HATCH	GYM
2	AM HISTORY	HENLEY	414
3	ENGLISH	CAGLE	203
4	CHOIR	TALLEY	513
5	TYPING	JOHNSON	212
6	ALGEBRA I	ROBERTS	313

STUDENT: JUSTIN STEEL

ADVISOR'S #: 400

GRADE: 10

COUNSELOR: BROWN

SCHEDULE:

0	NONE		
1	FOOTBALL	HUEY	GYM
2	AM HISTORY	HENLEY	414
3	ENGLISH	CAGLE	203
4	STUDY HALL	KILE	500
5	TYPING	JOHNSON	212
6	ALGEBRA I	ROBERTS	313

STUDENT: JARED DAVIS

ADVISOR'S #: 401

GRADE: 10

COUNSELOR: NEER

SCHEDULE:

0	NONE		
1	FOOTBALL	HUEY	GYM
2	AM HISTORY	HENLEY	414
3	ENGLISH	CAGLE	203
4	STUDY HALL	KILE	500
5	TYPING	JOHNSON	212
6	ALGEBRA I	ROBERTS	313

BCAI/Information Management/Info. Mgt. Applications/ ACTIVITY THREE (Continued)

STUDENT: DONNA CATE

ADVISOR'S #: 201

GRADE: 12

COUNSELOR: NEER

SCHEDULE:

0	GOVERNMENT	ROGERS	410
1	ACCOUNTING	BREWSTER	213
2	ENGLISH IV	HARDEN	210
3	OFFICE ADM	STEVENS	109
4	COOP TRAINING		
5	COOP TRAINING		
6	COOP TRAINING		

STUDENT: AMY NOLES

ADVISOR'S #: 202

GRADE: 12

COUNSELOR: BROWN

SCHEDULE:

0	GOVERNMENT	ROGERS	410
1	ACCOUNTING	BREWSTER	213
2	ENGLISH IV	HARDEN	210
3	OFFICE ADM	STEVENS	109
4	COOP TRAINING		
5	COOP TRAINING		
6	COOP TRAINING		

STUDENT: MIKE KOWACK

ADVISOR'S #: 201

GRADE: 12

COUNSELOR: FRENCH

SCHEDULE:

0	GOVERNMENT	ROGERS	410
1	ADV DRAFTING	HOPPER	108
2	ENGLISH IV	HARDEN	210
3	ICT	CROSS	105
4	COOP TRAINING		
5	COOP TRAINING		
6	COOP TRAINING		

SEARCH THE DATABASE FOR SPECIFIC RECORDS

INSTRUCTIONS: Using the "Schedule" database, search for the following information:

1. Where is Bryan King 3rd period?
2. Where is Todd West 5th period?
3. Does Chanda Coffee have a "O" period?
4. Who is in Ms. Harden's 2nd period class?
5. What students have study hall 6th period?

CREATE REPORT SUMMARIES AND PRINT REPORTS

INSTRUCTIONS: Using the "Schedule" database, print the following reports with proper headings.

Report 1-- Alphabetical list of students. List student name, grade, and counselor.

Report 2-- A listing of students who are in Government 0 period.

Report 3-- Alphabetical list of students who have Mrs. Stevens as an advisor. Her advisor number is 218.

Report 4-- Jeff Row needs a copy of his schedule.

Report 5-- A listing of all students in the 12th grade.

COMPETENCY TEST

INSTRUCTIONS: Using the accompanying data, complete the following steps.

1. Design an input form for entering the data. Have the design approved before proceeding.
2. Create the database.
3. Enter the data.
4. Search for the record of a particular customer.
5. Update the database according to instructions.
6. Sort the list by zip code.
7. Print mailing labels in zip code order, making a label for each customer with an outstanding balance of greater than \$5.00
8. Print an alphabetized report of names, account numbers, and balances.

COMPETENCY TEST DATA

Friendly Department Store Credit Customers

Ann Marie Johnson 807326001	1845 Fort Wayne Dr. 125.56	Keyland, FL	32145
Robert S. Scheely 574830112	2401 N. Nineteenth 316.75	Keyland, FL	32148
J. Francis Moran 594237479	P.O. Box 230 0.00	Brooks, FL	32087
Mrs. Karl Kuhn 203068843	433 Box Elder Ct. 45.65	Keyland, FL	32129
Janice Barlow 482938911	1618 Pinewood, Apt. 211 9.58	Maynard, FL	32205
Lupe Reyes 200304136	7402 S. Eleventh 0.49	Keyland, FL	32156
Jason D. McCook 831093225	Box 7211 1,006.25	Maynard, FL	32205
Eldon Schultz 384729836	212 Grand Key 83.14	Keyland, FL	32134
Ms. Eileen Kinder 234867433	4405 Palmfield 875.20	Keyland, FL	32145
Kelly Farrington 048429374	1234 Pinewood, #133A 119.65	Maynard, FL	32205

BCAI/Information Management/Info. Mgt. Applications/ COMPETENCY TEST

Jesse J. Cruz 144327887	2938 Oleander Cr. 64.83	Keyland, FL	32147
Jackson Andrews 373738901	732 W. Dayport St. 91.98	Keyland, FL	32184
Richard C. Lopez 270127637	P.O. Box 31141 210.77	Brooks, FL	32087
Anthony W. Williams 284983289	4001 Catalina Dr. 19.66	Keyland, FL	32166
Linda Jenkins 576785300	1647 Dade Rd., #31 107.10	Keyland, FL	32105
Dr. Paul Edwards 102569710	Curtis Bldg., #1025 1,438.74	Keyland, FL	32116
Alex Gregory 547380118	124 Wilson Hall 2.46	Brooks, FL	32087

BCAI/Information Management/Info. Mgt. Applications/ COMPETENCY TEST

The following transactions have occurred to update the file:

1. Account number 234867433 has a new balance of \$47.60.
2. Janice Barlow has moved to Apt. 238 at the same address.
3. Account number 284983289 has reduced his balance to \$4.66.
4. Mrs. Karl Kuhn now has her account listed under Marie S. Kuhn.
5. Linda Jenkins has a new balance of \$154.65.
6. Account number 102569710 has a new balance of 0.

The following new accounts have been opened:

Angela Lisa Torres	4230 Garrison Ave.	Maynard, FL	82206
283894821	28.16		
Christopher W. Gustafson	834 Swampwoods	Keyland, FL	32178
493765812	97.82		

The following account has been closed:

Ms. Eileen Kinder
234867433

COMPETENCY CHECKLIST

ESSENTIAL ELEMENT: 75.87(e)(4)(B)

The students will be provided opportunities to: apply general capabilities of database management.

OBJECTIVE: Students will create and set-up a database, enter data, sort and search the database, and design and print summaries and reports.

MASTERY

NON
MASTERY

1. Create a database.

☐☐

2. Design and edit input and report forms.

☐☐

3. Enter and manipulate data.

☐☐

4. Query the database.

☐☐

5. Use selection criteria for printing reports.

☐☐☐☐☐☐

STUDENT NAME _____

SECTION V
BUSINESS APPLICATION SOFTWARE

ESSENTIAL ELEMENT

75.87 (e)(5)

Concepts and skills related to business application software.

The student will be provided opportunities to:

- A. demonstrate the ability to use automated business application concepts, principles, and practices in realistic situations.

SUGGESTED UNIT LESSON PLAN

SECTION V: BUSINESS APPLICATION SOFTWARE

UNIT I: UTILITY PROGRAMS

ESSENTIAL 75.87
ELEMENT: (e)(5)(A)

ALLOCATED
TIME: 5 Hours

UNIT OBJECTIVE: Students will use various utility software programs to enhance their use of the computer.

STUDENT
OBJECTIVES:

After completing this unit, the student will be able to:

1. Define utility programs
2. Identify the use of several utility programs
3. Use utility programs to enhance computer management techniques

FOCUS:

Manipulating data in various ways is generally accomplished through typical application programs. However, there are needs for disk management procedures, methods of retrieving lost data, and ways of saving time.

DOMAINS:
DOMAINS:

Activities and competency tests have been designed to provide learning experiences and competency tests have been designed to provide learning experiences utilizing the affective, cognitive, and/or psychomotor domains.

BASIC SKILLS:

Activities and competency tests have been designed to reinforce the basic skills of reading, writing, and/or mathematics.

CONTENT OUTLINE

- I. Utility programs
- II. Print spoolers
 - A. Purpose
 - B. Procedure
- III. RAM disks
 - A. Defined
 - B. Disk-based programs
- IV. Keyboard enhancers
 - A. Redefining the meaning of keys
 - B. Creating keyboard macros
- V. Other utility programs
 - A. File encryption programs
 - B. File conversion programs
 - C. File indexes
 - D. File recovery programs

SUGGESTED TEACHER ACTIVITIES

General Teacher Preparation

1. Preview the unit and review objectives.
2. Decide on a variety of instructional methods to present the unit.
3. Prepare questioning techniques and closure statements.
4. Make modifications in curriculum for special needs students.
5. Consult several alternative sources to enhance and update your knowledge of the current trends, issues, and processes related to the unit content.
6. Select exercises, drills, and other resources to use as supplemental materials for the unit.
7. Secure and prepare sufficient quantities of software backup diskettes for student use.
8. When appropriate, take a field trip or have a guest speaker present a portion of the unit describing industry standards.
9. Prepare appropriate bulletin boards and transparencies.
10. Make copies of appropriate handouts, activities, and test materials.
11. Secure overhead projector, LCD computer panel for data projection, and an appropriate screen.

General Classroom Preparations

1. Secure the students' attention.
2. Communicate learning expectations--goals to be accomplished.
3. Emphasize the value/importance of the unit content or activity.
4. Relate unit content to prior or future learning.
 - a. Use discussions and pretests to determine prior knowledge of the unit content.
 - b. From the results of the discussions and pretests, modify your teaching plans to fit student needs.
 - c. Use enthusiasm, and relate the content to the student's interests.

Reteach Activities

1. Use a new method to reteach a unit activity.
2. Using additional resources, create individualized materials for the more and less capable students.
3. Utilize those sections of tests which need additional reinforcement.
4. Utilize unit activities not previously used.
5. Use peer practice for the reteaching of terminology--one student asks about the meaning of a word. The other student has the list of answers (words). Hints will be given until the word is matched with its correct definition.

BCAI/Business Application Software/Utility Programs/LESSON PLAN

Specific Teaching Activities

1. Select several utility packages that are representative of the areas covered in the unit, as well as utilities not covered in the unit.
2. The utilities area may be new to you, so take some time and work on each utility package. Several utilities may come in one package, and generally the cost for these packages is relatively low--less than \$50. If you know someone who is in a user group, they may be able to assist you in securing copies of public domain programs which are very inexpensive.
3. User group members, parents of your students, and even the students themselves may be very helpful in this unit. They could demonstrate the various types of utilities they have which may vary from what you have secured.
4. Make computer periodicals and newspapers available for student use.

Activity One

Project 2 Assign each student a particular periodical to use in preparing their tests. Have a class discussion comparing their findings.

Activity Three Provide students with a utility program and have them perform tasks you assign which are specific to that package. You may wish to rotate students on three or four utilities so they have the opportunity to work on each one.

Competency Test

Part 1 Provide students with a utility program and instructions for tasks to be performed.

ANSWERS TO ACTIVITIES

Activity One

Project 1 Brief, inexpensive, single-task programs that perform various useful functions that allow the computer to work faster and more efficiently.

Project 2 Evaluated to the satisfaction of the instructor.

Activity Two	1.	H
	2.	D
	3.	C
	4.	B
	5.	A
	6.	I
	7.	F
	8.	E

Activity Three Evaluated to the satisfaction of the instructor.

COMPETENCY TEST ANSWERS

1. Brief, inexpensive, single-task programs that perform various useful functions that allow the computer to work faster and more efficiently.
2. Evaluated to the satisfaction of the instructor.
3. Keyboard enhancers are used to customize the computer keyboard. They redefine the meaning of keys. Can redefine all of the keys--changing the keyboard from the typical QWERTY design to a DVORAK design.

Keyboard macros assign a series of keystrokes to a single key to save time. File can be saved so that it can be repeated--sometimes in their own files so they can be utilized without programs.

File indexes are used to print out lists of files stored on disks. They list files in sorted order.

File conversion programs convert files created on one program or operating system so that they can be run on another.

Print spoolers provide a partial solution to save computer time when printing out long files. They designate a part of the computer's memory as a print buffer.

Copy-protection programs ensure that a disk cannot be copied by other users.

File-recovery programs restore files that have been inadvertently deleted from a disk.

BCAI/Business Application Software/Utility Programs/ANSWERS

File encryption programs can encrypt data stored on disks or transmitted over telephone lines so that it cannot be retrieved by users without a password.

RAM disks software programs set aside a part of the computer's memory for the storage of programs and data files.

4. Evaluated to the satisfaction of the instructor.

ANSWERS TO ACTIVITIES

Activity One

- Project 1 Brief, inexpensive, single-task programs that perform various useful functions that allow the computer to work faster and more efficiently.
- Project 2 Evaluated to the satisfaction of the instructor.

- Activity Two**
- | | |
|----|---|
| 1. | H |
| 2. | D |
| 3. | C |
| 4. | B |
| 5. | A |
| 6. | I |
| 7. | F |
| 8. | E |

Activity Three Evaluated to the satisfaction of the instructor.

COMPETENCY TEST ANSWERS

1. Brief, inexpensive, single-task programs that perform various useful functions that allow the computer to work faster and more efficiently.
2. Evaluated to the satisfaction of the instructor.
3. Keyboard enhancers are used to customize the computer keyboard. They redefine the meaning of keys. Can redefine all of the keys--changing the keyboard from the typical QWERTY design to a DVORAK design.

Keyboard macros assign a series of keystrokes to a single key to save time. File can be saved so that it can be repeated--sometimes in their own files so they can be utilized without programs.

File indexes are used to print out lists of files stored on disks. They list files in sorted order.

File conversion programs convert files created on one program or operating system so that they can be run on another.

Print spoolers provide a partial solution to save computer time when printing out long files. They designate a part of the computer's memory as a print buffer.

Copy-protection programs ensure that a disk cannot be copied by other users.

File-recovery programs restore files that have been inadvertently deleted from a disk.

File encryption programs can encrypt data stored on disks or transmitted over telephone lines so that it cannot be retrieved by users without a password.

RAM disks software programs set aside a part of the computer's memory for the storage of programs and data files.

4. Evaluated to the satisfaction of the instructor.

ANSWERS TO ACTIVITIES

Activity One

Project 1 Brief, inexpensive, single-task programs that perform various useful functions that allow the computer to work faster and more efficiently.

Project 2 Evaluated to the satisfaction of the instructor.

- Activity Two
- | | |
|----|---|
| 1. | H |
| 2. | D |
| 3. | C |
| 4. | B |
| 5. | A |
| 6. | I |
| 7. | F |
| 8. | E |

Activity Three Evaluated to the satisfaction of the instructor.

COMPETENCY TEST ANSWERS

1. Brief, inexpensive, single-task programs that perform various useful functions that allow the computer to work faster and more efficiently.
2. Evaluated to the satisfaction of the instructor.
3. Keyboard enhancers are used to customize the computer keyboard. They redefine the meaning of keys. Can redefine all of the keys--changing the keyboard from the typical QWERTY design to a DVORAK design.

Keyboard macros assign a series of keystrokes to a single key to save time. File can be saved so that it can be repeated--sometimes in their own files so they can be utilized without programs.

File indexes are used to print out lists of files stored on disks. They list files in sorted order.

File conversion programs convert files created on one program or operating system so that they can be run on another.

Print spoolers provide a partial solution to save computer time when printing out long files. They designate a part of the computer's memory as a print buffer.

Copy-protection programs ensure that a disk cannot be copied by other users.

File-recovery programs restore files that have been inadvertently deleted from a disk.

BCA/ Business Application Software/Utility Programs/ANSWERS

File encryption programs can encrypt data stored on disks or transmitted over telephone lines so that it cannot be retrieved by users without a password.

RAM disks software programs set aside a part of the computer's memory for the storage of programs and data files.

4. Evaluated to the satisfaction of the instructor.

SUGGESTED UNIT LESSON PLAN

SECTION IV: BUSINESS APPLICATION SOFTWARE

UNIT II: PRODUCTIVITY PROGRAMS

**ESSENTIAL 75.87
ELEMENT: (e)(5)(A)**

**ALLOCATED
TIME: 10 Hours**

UNIT OBJECTIVE: Students will identify several types of productivity programs and be able to load, access, and use them productively.

**STUDENT
OBJECTIVES:**

After completing this unit, the student will be able to:

1. Identify and describe various types of productivity software
2. Load, access, and use two productivity programs

FOCUS: One of the goals of the automated electronic office is to improve productivity, and there are many software programs. An awareness of their availability and use is extremely valuable for entry-level personnel.

DOMAINS: Activities and competency tests have been designed to provide learning experiences utilizing the affective, cognitive, and/or psychomotor domains.

BASIC SKILLS: Activities and competency tests have been designed to reinforce the basic skills of reading, writing, and/or mathematics.

CONTENT OUTLINE

- I. Project management
 - A. Defined
 - B. Answers several questions
 - C. Business uses
 - D. Rules of project management
 - E. Questions to ask
 - F. Means of improving a project's schedule
 - 1. The critical path
 - 2. Crashing schedules
 - 3. Graphics
- II. Desktop managers
 - A. Defined
 - B. Procedures for use
 - C. Allows data to be moved into and out of windows and programs.
 - D. Common features
 - E. Personalizes a microcomputer system for its user
 - F. Software packages
- III. Idea processors
 - A. Defined
 - B. Methods
 - C. Uses
 - D. Programs

SUGGESTED TEACHER ACTIVITIES

General Teacher Preparation

1. Preview the unit and review objectives.
2. Decide on a variety of instructional methods to present the unit.
3. Prepare questioning techniques and closure statements.
4. Make modifications in curriculum for special needs students.
5. Consult several alternative sources to enhance and update your knowledge of the current trends, issues, and processes related to the unit content.
6. Select exercises, drills, and other resources to use as supplemental materials for the unit.
7. Secure and prepare sufficient quantities of software backup diskettes for student use.
8. When appropriate, take a field trip or have a guest speaker present a portion of the unit describing industry standards.
9. Prepare appropriate bulletin boards and transparencies.
10. Make copies of appropriate handouts, activities, and test materials.
11. Secure overhead projector, LCD computer panel for data projection, and an appropriate screen.

General Classroom Preparations

1. Secure the students' attention.
2. Communicate learning expectations--goals to be accomplished.
3. Emphasize the value/importance of the unit content or activity.
4. Relate unit content to prior or future learning.
 - a. Use discussions and pretests to determine prior knowledge of the unit content.
 - b. From the results of the discussions and pretests, modify your teaching plans to fit student needs.
 - c. Use enthusiasm, and relate the content to the student's interests.

Reteach Activities

1. Use a new method to reteach a unit activity.
2. Using additional resources, create individualized materials for the more and less capable students.
3. Utilize those sections of tests which need additional reinforcement.
4. Utilize unit activities not previously used.
5. Use peer practice for the reteaching of terminology--one student asks about the meaning of a word. The other student has the list of answers (words). Hints will be given until the word is matched with its correct definition.

BCAI/Business Application Software/Productivity Programs/LESSON PLAN

Specific Teaching Activities

1. Secure copies of several utility programs. They are relatively inexpensive. Check a listing of public domain software for titles. These will meet anyone's budget.
2. Utilize user club members, parents of students, and others with computer experience to demonstrate their packages of productivity software.

Activity Two Provide instructions and two productivity software packages for students to use.

Competency Test

Part 3 Provide a productivity program and instructions for tasks students are to demonstrate.

ANSWERS TO ACTIVITIES

Activity One

Project 1

1. Project management
2. Desktop managers
3. Idea processing
4. Desktop managers
5. Project management
6. Desktop managers
7. Desktop managers
8. Project management
9. Idea processing
10. Idea processing

Project 2

Evaluated to the satisfaction of the instructor.

Activity Two

Evaluated to the satisfaction of the instructor.

COMPETENCY TEST ANSWERS

1. a. Idea processing (any three)
 1. Similar to jotting down notes
 2. Reorganizes ideas and topics
 3. Combines related topics
 4. Breaks page topics into sections
 5. Easy to add or delete topics
 - b. Desktop managers (any three)
 1. Personal productivity tool
 2. Contains calendars, notebooks, and calculators
 3. Accessed while in another program
 4. Combines different functions
 5. Personalizes computer for the user
 - c. Project managers (others answers may be correct)
 1. Answers difficult questions
 2. Little expertise is needed to operate these programs
 3. Several means of improvement
2. and 3. Evaluated to the satisfaction of the instructor.

BCAI/Business Application Software/RESOURCES

There are several hundred utility programs available for Apple and IBM computers. These are just a small sample listing.

SOFTWARE

BEST OF UTILITIES--DISK ARRANGER, CATALOG
The Public Domain Exchange
2074C Walsh, Ste. 525
Santa Clara, CA 95050
Apple family

CRUISE CONTROL
Tiger Software
Speeds cursor

CUBIT
Tiger Software
800 Douglas Entrance, 7th floor
Coral Gables, FL 33134
File compressor or hard or floppy disks
IBM PC, PS/2 128K memory

DISKETTE MANAGER 3
Tiger Software
Organizes, creates labels, and produces reports for diskettes

DUET
Tiger Software
Print spooling and sideways printing
Laser support
IBM PC, PS/2 256K memory

INTELLIGENT BACKUP
Tiger Software
IBM PC, PS/2 320K memory

POP DROP
Tiger Software
Removes and replaces RAM without rebooting the system

SOFTWARE BRIDGE
Tiger Software
Converts documents from one word processing program to another
IBM PC, PS/2 384K memory

SOFTWARE CAROUSEL
Tiger Software
Loads several programs at a time and switches between them
IBM PC, PS/2 256K memory

TIMEOUT SERIES
Beagle Bros. Software
9 programs that enhance AppleWorks program
Apple family

TORNADO NOTES
Tiger Software
Pop-up notepad and indexer

SECTION V: BUSINESS APPLICATION SOFTWARE

UNIT I: UTILITY PROGRAMS

UNIT OBJECTIVE:

Students will use various utility software programs to enhance their use of the computer.

STUDENT OBJECTIVES:

After completing this unit, the student will be able to:

1. Define utility programs
2. Identify the use of several utility programs
3. Use utility programs to enhance computer management techniques

GENERALIZATION:

Manipulating data in various ways is generally accomplished through typical application programs. However, there are needs for disk management procedures, methods of retrieving lost data, and ways of saving time.

UNIT OVERVIEW

- I. Utility programs--brief, inexpensive, single-task programs that perform various useful functions that allow the computer to work faster and more efficiently.
- II. Print spoolers
 - A. Purpose
 1. Provide a partial solution to save computer time when printing out long files.
 2. Designate a part of the computer's memory as a print buffer.
 - a. When print command is issued, data are printed to the specified memory area.
 - b. Computer relays the data to the printer and returns the rest of the memory to the control of the computer so that other files can be worked on.
 3. Allows the computer to do two things at the same time--Prints data in the background while another file is worked on in the foreground.
 - B. Procedure takes more time to access file because the computer is waiting for the CPU to be released from printing.
- III. RAM disks
 - A. Defined--software programs that set aside a part of the computer's memory for the storage of programs and data files.
 1. If you have a one disk drive system, the drive is A and the memory is called B.
 2. The program treats this area of memory as if it were a second disk drive.
 - a. If computer is turned off, the data in this area will be lost.
 - b. However, data can be stored and retrieved more quickly, a feature that makes it valuable for certain applications.
 - B. Disk-based programs
 1. Only the core of the program is in memory the entire time.
 2. Only accesses the disk for overlays when they are needed.
 - a. Program stops momentarily

BCA/Business Application Software/Utility Programs/UNIT OVERVIEW

- b. Disk drive spins while the overlay is moved from the disk into memory.
 - 3. Speed is increased with RAM disks
 - IV. Keyboard enhancers are used to customize the computer keyboard.
 - A. Redefining the meaning of keys
 - 1. Press the redefined key
 - a. Program intercepts the signal
 - b. Converts it to the signal for the newly assigned meaning of the key
 - c. Sends that signal to the computer.
 - 2. Can redefine all of the keys--changing the keyboard from the typical QWERTY design to a DVORAK design.
 - B. Creating keyboard macros
 - 1. Defined--Assigning a series of keystrokes to a single key to save time.
 - 2. File can be saved so that it can be repeated--sometimes in their own files so they can be utilized without programs.
 - 3. Once the key is assigned, the ALT or CONTROL keys may be used to execute the command.
- V. Other utility programs
 - A. File encryption programs
 - 1. Encrypted data stored on disks or transmitted over telephone lines cannot be retrieved by users without a password.
 - 2. Important when using hard disk systems and on networks where a number of people have access to data files.
 - 3. Encryption systems in use
 - a. Hardware based
 - b. Software based
 - c. Combination of hardware and software
 - 4. U.S. Data Encryption Standard (DES) primarily used on mainframes and sometimes on microcomputers.

BCA/Business Application Software/Utility Programs/UNIT OVERVIEW

- B. File conversion programs convert files created on one program or operating system so that they can be run on another.
- C. File indexes are used to print out lists of files stored on disks.
 - 1. Lists files in sorted order
 - 2. Provides comments including the date the files were created
 - 3. File sizes added
- D. File recovery programs
 - 1. Restore files that have been inadvertently deleted from a disk.
 - a. Erase command deletes the first character in the file name from the disk directory.
 - b. All of the other data are left intact until another file is saved on top of it.
 - 2. When the mistake is discovered in time, the file can be restored to the directory so that it can be retrieved.
 - 3. Copy-protection programs ensure that a disk cannot be copied by other users.

UTILITY PROGRAMS

Project 1

INSTRUCTIONS: Define utility programs.

Project 2

INSTRUCTIONS: Using periodicals available, make a list of the utility programs advertised. If possible, write a one-two sentence description of each one.

IDENTIFICATION OF UTILITY PROGRAMS

INSTRUCTIONS: Match the utility program with its description.

- | | | | |
|----------|--|----|--------------------|
| _____ 1. | Single task programs that perform various useful functions | A. | File indexes |
| _____ 2. | Uses a portion of the computer's memory for storage of programs and data files | B. | File conversion |
| _____ 3. | Uses the DES | C. | File encryption |
| _____ 4. | Allows files to be used in more than one program or with one operating system | D. | RAM disk |
| _____ 5. | Lists files in sorted order | E. | Print spoolers |
| _____ 6. | Restores files | F. | Copy-protection |
| _____ 7. | Ensures that a disk cannot be duplicated | G. | Keyboard enhancers |
| _____ 8. | Saves computer time when printing out long files | H. | Utilities |
| | | I. | File recovery |

USING UTILITY PROGRAMS

INSTRUCTIONS: Using the utility programs and instructions provided by your instructor, perform the tasks assigned.

COMPETENCY TEST

INSTRUCTIONS: Complete the following.

1. Define utility programs:
2. List and describe four utility programs that you found in your research.
 - a.
 - b.
 - c.
 - d.
3. Describe what each of the following types of utility programs do and give an example of a program name for each one.
 - Enhanced keyboard
 - Keyboard macros
 - File indexes
 - File conversions

BCAI/Business Application Software/Utility Programs/COMPETENCY TEST

Print spoolers

Copy-protection

File recovery

File encryption

RAM disk

4. Using a utility program and instructions provided by your teacher, perform a utility function.

COMPETENCY CHECKLIST

ESSENTIAL ELEMENT: 75.87(e)(5)(A)

The students will be provided opportunities to: demonstrate the ability to use automated business application concepts, principles, and practices in realistic situations.

OBJECTIVE: Students will use various utility software programs to enhance their use of the computer.	MASTERY	NON MASTERY
--	---------	-------------

1. Define utility programs.	_____	_____
-----------------------------	-------	-------

2. Identify the use of several utility programs.	_____	_____
--	-------	-------

3. Use utility programs to enhance computer management techniques.	_____	_____
	_____	_____
	_____	_____

STUDENT NAME _____

SECTION V: BUSINESS APPLICATION SOFTWARE

UNIT II: PRODUCTIVITY PROGRAMS

UNIT OBJECTIVE:

Students will identify several types of productivity programs and be able to load, access, and use them productively.

STUDENT OBJECTIVES:

After completing this unit, the student will be able to:

1. Identify and describe various types of productivity software.
2. Load, access, and use two productivity programs.

GENERALIZATION:

One of the goals of the automated electronic office is to improve productivity, and there are many software programs. An awareness of their availability and use is extremely valuable for entry level personnel.

UNIT OVERVIEW

- I. Project management
 - A. Defined--the systematic overseeing of the progression of a project so that it is completed both on schedule and within the budget
 - B. Answers the following questions which are difficult to answer, especially when the project is complex or when there are other projects conducted simultaneously.
 1. The earliest a project can be completed
 2. The cost to do it faster.
 3. Best means of organization of the project steps and the staff needed to complete the stages
 4. Initiation and completion time for each stage
 5. Latest date a final decision can be made about the project
 6. The affects of the timing of the various project stages and the cash flow
 7. Personnel requirements and scheduling.
 - C. Business uses--include every area of business but have been extensively used in the construction and defense industries. Very sophisticated analytical techniques are used to help gather, organize, and manipulate project management data.
 1. The sequence, timing, and costs of thousands of individual steps require coordination and control.
 2. Techniques include critical paths, PERT (program evaluation and review) charts, Gantt charts, and crashing schedules.
 3. Used for only the very expensive projects.
 4. Primarily first used on mainframes and now they are used on microcomputers.
 5. Little expertise is needed in operating these programs
 - D. Rules of project management
 1. Concerned with three variables

BCAI/Business Application Software/Productivity Programs/UNIT OVERVIEW

- a. Break the project down into stages or tasks and key events, or milestones. Defines the projects number of tasks and at least two milestones--a beginning and an end
 - b. Organize stages into a logical sequence, with a starting date and duration determined for each step.
 - c. Calculate costs frequently related to when tasks are done and how long they take.
2. Traditionally, project planning has been time-consuming and expensive--especially when schedule needs to be optimized or to explore "what-if" questions.
- E. Questions to ask when scheduling a project so that one knows immediately what the impact would be on the budget and completion date of the project.
1. What if some steps can be completed faster?
 2. What if some steps take longer than expected?
 3. What if the budget is cut for some of the project?
- F. Means of improving a project's schedule
1. The critical path
 - a. Know the sequence in which tasks must be completed and how long each one takes. You can then find a series of tasks that are sequential and interdependent.
 - b. Each subsequent task cannot be begun until the previous one is completed.
 - c. The dependent tasks are laid out end-to-end; they form the project's critical path.

Example: The signature cannot be put on a letter until the letter's body parts have been completed. A roof cannot be put on a house until the walls are up.
 2. Crashing schedules--speeding up a project
 - a. Accomplished by changing the dates on the critical path.
 - (1) To complicate matters, an existing critical path may result in another path becoming critical; therefore, changes may require rapid completion of tasks on the new critical path.

(2) Specific tasks can sometimes be accomplished by spending additional money and cutting funds allocated for other tasks.

b. The order, timing, and cost of individual tasks are interrelated. They all affect the total cost of the project and its final completion date.

c. This minimizes the time and costs associated with a project. A careful analysis of each step in the process is required.

3. Graphics

a. Generate two basic types of graphics if the manager has entered the beginning dates and duration of all tasks.

1. PERT charts show the relationship of the individual task and milestones in a project and the flow of the project.

2. Gantt charts use bars and a time line to illustrate the beginning and ending dates of each task making up the project

b. Often used to show the complex relationship in the timing and sequence of a project.

II. Desktop managers

A. Defined as personal productivity tools.

1. These are all accessed while in another program.

2. They are really integrated systems because they combine different functions.

B. Procedures for use

1. Program is loaded into the computer before loading other application program.

a. Can be displayed on the screen even when working on other programs

b. Accessed by pressing a few keys

2. The menu, which lists the available functions, can be displayed by pressing just two keys.

3. Operations of the other program is suspended when in desktop manager. When another key is pressed, the desktop manager leaves and the screen returns to the program.

BCAI/Business Application Software/Productivity Programs/UNIT OVERVIEW

4. Highlight the function on the menu and press the return key.
 - C. Allows data to be moved into and out of windows and programs.
 - D. Common features
 1. Calendars for scheduling meetings
 2. Calculators which provides the same capabilities of a hand-held calculator
 3. Notebooks to write brief notes
 4. Phone directories to keep an updated list of phone numbers
 5. Auto dialer--used in conjunction with a Hayes Smartmodem or compatible modems
 6. ASCII table
 7. Timing devices with alarms
 - E. Personalizes a microcomputer system for its user--begins to reflect the habits of the user.
 - F. Software examples are: Sidekick and Apple Macintosh Desktop Accessories, and Deskmate.
- III. Idea processors
 - A. Defined as a program that helps to gather and organize ideas.
 1. It is similar to jotting down notes as they come to mind.
 2. Written on notepads, restaurant napkins, business cards, and almost every other conceivable place.
 - B. Methods
 1. Traditional
 - a. Generate idea
 - b. Collect idea
 - c. Organize idea
 2. Break them down into steps or topics

BCAI/Business Application Software/Productivity Programs/UNIT OVERVIEW

C. Uses

1. Quickly reorganize ideas and topics
2. Easily add new topics and delete unnecessary topics
3. Combine related topics
4. Break page topics into subtopics

D. Programs

1. The first idea processor was Think Tank which allows ideas to be entered, moved, and inserted to reorganize them in outline form.
2. Framework, an integrated program, can also be used as an idea processor. It organizes and reorganizes frames in an outline.
 - a. Some ideas can be expressed best in words, others in numbers, lists, or graphs.
 - b. Functions allow the most appropriate form to be selected.

TYPES OF PRODUCTIVITY SOFTWARE

Project 1

INSTRUCTIONS: Identify the type of productivity software described below. Each type of software may be used more than once.

- _____ 1. Techniques that include critical paths, PERT, and Gantt charts, and crashing schedules.
- _____ 2. Contains a calculator, notepad, ASCII chart, etc.
- _____ 3. A program that helps to gather and organize ideas.
- _____ 4. Program that is loaded into the computer before other applications.
- _____ 5. Used primarily in the construction and defense industry.
- _____ 6. Personalizes the computer for the user.
- _____ 7. Sidekick
- _____ 8. The systematic overseeing of the progression of a project so that it is completed on schedule and within the budget.
- _____ 9. Traditional method of collecting data was to jot down notes.
- _____ 10. Think Tank

Project 2

INSTRUCTIONS: Using current computer magazines, research several new productivity programs. Write a paper discussing two of the programs and share your findings with the class.

USING PRODUCTIVITY PROGRAMS

INSTRUCTIONS: Load, access, and use two productivity programs provided by your teacher using the instructions provided.

COMPETENCY TEST

1. Describe three characteristics of each of the following productivity programs.

a. Idea processing

- 1.
- 2.
- 3.

b. Desktop managers

- 1.
- 2.
- 3.

c. Project managers

- 1.
- 2.
- 3.

2. List three sample software programs for each type of productivity program.

Idea processing

- a.
- b.
- c.

Desktop managers

- a.
- b.
- c.

Project managers

- a.
- b.
- c.

3. Load, access, and use two productivity programs provided by your teacher using the instructions provided.

COMPETENCY CHECKLIST

ESSENTIAL ELEMENT: 75.87(e)(5)(A)

The students will be provided opportunities to: demonstrate the ability to use automated business application concepts, principles, and practices in realistic situations.

OBJECTIVE: Students will identify several types of productivity programs and be able to load, access, and use them productively.	MASTERY	NON MASTERY
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1. Identify and describe various types of productivity software.

2. Load, access, and use two productivity programs.

STUDENT NAME _____

SECTION VI
SOCIAL IMPLICATIONS

ESSENTIAL ELEMENT

75.87 (e)(6)

Concepts and skills related to computer operations.

The student will be provided opportunities to:

- A. observe and/or participate in computer activities in business and industry;
- B. understand responsibilities and procedures involved in computer operations with individuals working in the field; and
- C. identify emerging computer tools and understand their impact on business and industry.

SUGGESTED UNIT LESSON PLAN

SECTION VI: SOCIAL IMPLICATIONS

UNIT I: EFFECTS ON SOCIETY

ESSENTIAL 75.87
ELEMENT: (e)(6)(A)(B)

ALLOCATED
TIME: 10 Hours

UNIT OBJECTIVE: Students will describe the issues related to responsible use of computer systems, appraise the social ramifications of computer usage by society, identify responsible practices in the use of computers, and identify the major job categories, experience, and training needed for positions in the computer field.

STUDENT
OBJECTIVES:

After completing this unit, the student will be able to:

1. Identify the major issues relating to computers and society
2. Point out the risks to privacy brought about by electronic storage of data
3. Describe the ethical and legal issues that have arisen as a result of the computer revolution
4. Tell the reasons for concern about reliability of software, hardware, and systems
5. Identify job categories and the experience and training needed for positions in the computer field

FOCUS:

Using a computer is like using a piece of powerful machinery such as an automobile. Most people use computers harmlessly and responsibly, but if the user is irresponsible, careless, or malicious, the effects of decisions and actions can be far reaching and damaging. As new hardware and software is assimilated into industry and other organizations, it follows that new jobs will evolve, and some old ones will become obsolete. Computers have caused so many changes in the way we live and work that society is totally dependent upon them (as it is on the automobile). The first step toward responsible use of computers is understanding the scope and implications of the relationship between society and technology.

DOMAINS:

Activities and competency tests have been designed to provide learning experiences utilizing the affective, cognitive, and/or psychomotor domains.

BASIC SKILLS:

Activities and competency tests have been designed to reinforce the basic skills of reading, writing, and/or mathematics.

CONTENT OUTLINE

- I. Issues
 - A. Dependency
 - B. Computer crime
 - C. Nameless society
 - D. Rapid changes
- II. Responsible use
 - A. Confidentiality
 - B. Accuracy
- III. Privacy
 - A. Destination of copies
 - B. Originator of data
 - C. Credit bureaus
 - D. Data banks
- IV. Values and reliability of systems
 - A. Hardware
 - B. Storage media
 - C. People
- V. Legal and ethical issues
 - A. Data spying
 - B. Hackers
 - C. Employees or former employees
 - D. Copyright laws
- VI. Job categories
 - A. New jobs
 - B. Categories of computer-related jobs
- VII. Preparation for the various computer-related jobs
 - A. Education
 - B. Training
 - C. Experience
- VIII. Microcomputer-related careers

SUGGESTED TEACHER ACTIVITIES

General Teacher Preparation

1. Preview the unit and review objectives.
2. Decide on a variety of instructional methods to present the unit.
3. Prepare questioning techniques and closure statements.
4. Make modifications in curriculum for special needs students.
5. Consult several alternative sources to enhance and update your knowledge of the current trends, issues, and processes related to the unit content.
6. Select exercises, drills, and other resources to use as supplemental materials for the unit.
7. Secure and prepare sufficient quantities of software backup diskettes for student use.
8. When appropriate, take a field trip or have a guest speaker present a portion of the unit describing industry standards.
9. Prepare appropriate bulletin boards and transparencies.
10. Make copies of appropriate handouts, activities, and test materials.
11. Secure overhead projector, LCD computer panel for data projection, and an appropriate screen.

General Classroom Preparations

1. Secure the students' attention.
2. Communicate learning expectations--goals to be accomplished.
3. Emphasize the value/importance of the unit content or activity.
4. Relate unit content to prior or future learning.
 - a. Use discussions and pretests to determine prior knowledge of the unit content.
 - b. From the results of the discussions and pretests, modify your teaching plans to fit student needs.
 - c. Use enthusiasm, and relate the content to the student's interests.

Reteach Activities

1. Use a new method to reteach a unit activity.
2. Using additional resources, create individualized materials for the more and less capable students.
3. Utilize those sections of tests which need additional reinforcement.
4. Utilize unit activities not previously used.
5. Use peer practice for the reteaching of terminology--one student asks about the meaning of a word. The other student has the list of answers (words). Hints will be given until the word is matched with its correct definition.

BCAI/Social Implications/Effects on Society/LESSON PLAN

Specific Teaching Activities

1. Collect magazine and newspaper articles (relating to computers and social issues) for display and discussion.
2. Make transparencies or charts, outlining the major issues.
3. Compile a list of specific topics for students to use in individual research, based upon available materials.
4. Schedule a speaker to discuss the importance of reliable systems, and methods used to achieve them.
5. Plan a visit to the school library to search for information about computers and privacy, or legal issues.
6. Obtain current information about the local job market from sources such as the Chamber of Commerce, local news media, and advisory committee members.
7. Contact business representatives who can provide speakers representing different computer job categories.
8. Develop a resource list for students using the school and community libraries, industry publications, and local business groups and organizations.
9. Duplicate sufficient quantities of student information sheets on comparative job data.
10. Arrange a field trip to a local business so that students can view computer professionals on the job.
11. Obtain college catalogs and other descriptive materials so that students can discover what additional education is available to prepare for professional positions in the computer field.

Activity Three

- Project 1 Discuss each question and the possible answers on this activity with the students.

Activity Five

- Project 2 Secure a copy of the Occupational Outlook Handbook and other career and labor market resources.

- Project 3 Make employment sections of various newspapers available to students.

NOTE: THIS UNIT IS AN EXACT DUPLICATE OF SECTION VII UNITS 1-2 IN MICROCOMPUTER APPLICATIONS.

ANSWERS TO ACTIVITIES

Activity One

Project 1 List should include: dependency, computer crime, nameless society, and changes.

Description evaluated to the satisfaction of the instructor.

Project 2 Evaluated to the satisfaction of the instructor.

Activities Two - Four Evaluated to the satisfaction of the instructor.

Activity Five

<u>Project 1</u>	1.	D	6.	J	11.	F
	2.	H	7.	K	12.	M
	3.	A	8.	C	13.	O
	4.	N	9.	P	14.	I
	5.	G	10.	L	15.	B

Projects 2-3 Evaluated to the satisfaction of the instructor.

COMPETENCY TEST ANSWERS

1. Select any two of the following examples:

Credit checking and verification
Airline reservations
Bank deposits and withdrawals
Income tax processing
Dispatching emergency services
Telephone systems
Monthly billing
Social security
Payroll for large employers

Discussion evaluated to the satisfaction of the instructor.

2. Electronic data spying
Credit card fraud
Embezzlement by altering programs or stored data
3. Advantages: Speed of identification, reliability, no problem with duplicate names
Disadvantages: Too impersonal, easy to forget a number, people resent being referred to by number

BCAI/Social Implications/Effects on Society/ANSWERS

4. Skills will become obsolete.
Potential users will not be able to understand new processes.
Changes will come faster than they can adapt.
Newly purchased hardware will soon be out of date.
New programs will not work on their equipment.
5. Confidential data stored in a database is out of the control of the person who is the subject of the data.
6. Hardware, storage media, software, people
7. One of the following:

Through modems; Disclosure of passwords
8. Information about programs and sensitive data from previous employer's files can be passed on to another company by former employees.
9. Destruction or alteration of software and data.
10. Publishers try to make disks uncopyable, license the copying of disks they publish, and use the honor system.
11. Data clerk, data entry operator, word processor
12. Computer programmer, systems analyst, database manager
13. Systems analyst, systems programmer, console operator
14. A job that does not require previous experience
15. Computer operator (console or peripheral operator)
16. Computer sales
17. Systems programmer or system developer
18. Data entry operator
19. Computer technician
20. Systems analyst

SUGGESTED UNIT LESSON PLAN

SECTION VI: SOCIAL IMPLICATIONS

UNIT II: FUTURE IMPLICATIONS

**ESSENTIAL 75.87
ELEMENT: (e)(6)(C)**

**ALLOCATED
TIME: 5 Hours**

UNIT OBJECTIVE: Students will identify future trends of hardware and software in the computer industry and other related developments.

**STUDENT
OBJECTIVES:** After completing this unit, the student will be able to:

1. Describe the future trends of hardware and software in the computer industry
2. Identify new emerging technologies

FOCUS: New hardware, software, and communications techniques are being developed and refined daily. The business personnel of today will not be performing their jobs the same way they have in the past because of the impact on technology.

DOMAINS: Activities and competency tests have been designed to provide learning experiences utilizing the affective, cognitive, and/or psychomotor domains.

BASIC SKILLS: Activities and competency tests have been designed to reinforce the basic skills of reading, writing, and/or mathematics.

CONTENT OUTLINE

- I. Hardware advances
 - A. Voice synthesis
 - B. Voice-recognition computers
 - C. Computer vision
 - D. Digitizers
 - E. High-quality monitors
 - F. Fiber optics
 - G. Decrease in size and increase in speed
 - H. Optical computers
 - I. Storage improvements
- II. Computer software
 - A. New advances
 - B. New features

SUGGESTED TEACHER ACTIVITIES

General Teacher Preparation

1. Preview the unit and review objectives.
2. Decide on a variety of instructional methods to present the unit.
3. Prepare questioning techniques and closure statements.
4. Make modifications in curriculum for special needs students.
5. Consult several alternative sources to enhance and update your knowledge of the current trends, issues, and processes related to the unit content.
6. Select exercises, drills, and other resources to use as supplemental materials for the unit.
7. Secure and prepare sufficient quantities of software backup diskettes for student use.
8. When appropriate, take a field trip or have a guest speaker present a portion of the unit describing industry standards.
9. Prepare appropriate bulletin boards and transparencies.
10. Make copies of appropriate handouts, activities, and test materials.
11. Secure overhead projector, LCD computer panel for data projection, and an appropriate screen.

General Classroom Preparations

1. Secure the students' attention.
2. Communicate learning expectations--goals to be accomplished.
3. Emphasize the value/importance of the unit content or activity.
4. Relate unit content to prior or future learning.
 - a. Use discussions and pretests to determine prior knowledge of the unit content.
 - b. From the results of the discussions and pretests, modify your teaching plans to fit student needs.
 - c. Use enthusiasm, and relate the content to the student's interests.

Reteach Activities

1. Use a new method to reteach a unit activity.
2. Using additional resources, create individualized materials for the more and less capable students.
3. Utilize those sections of tests which need additional reinforcement.
4. Utilize unit activities not previously used.
5. Use peer practice for the reteaching of terminology--one student asks about the meaning of a word. The other student has the list of answers (words). Hints will be given until the word is matched with its correct definition.

Specific Teaching Activities

1. This unit was purposely kept vague and general because there are daily announcements of new products and future developments.
2. It is important for students to find the newest developments and future trends through the use of various forms of media.

Activity Two Provide several types of media for students to use in completing research.

ANSWERS TO ACTIVITIES

Activities One and Two

Evaluated to the satisfaction of the instructor.

COMPETENCY TEST ANSWERS

Evaluated to the satisfaction of the instructor.

BCAI/Social Implications/RESOURCES

MEDIA

*ACCOUNTING AND DATA
PROCESSING CAREERS*
South-Western Publishing Co.

BUSINESS CAREERS
South-Western Publishing Co.
Text, workbook

CAREER EXPLORATION
South-Western Publishing Co.
Disk and student manual, documents
and supplies for Apple II, IIc; TRS-80 Model III

CAREER SURVEYS
Career Aids, Inc.

CAREERS IN OFFICE SERVICES
Career Aids, Inc.
Four sound filmstrips, educator's guide

COMPUTERS AND YOU
16 mm film, 15 minutes
Journal Films, Inc.

COMPUTERS AND THE FUTURE
16 mm film, 30 minutes
Time Life Multimedia

COMPUTERS IN SOCIETY
16 mm film, 17 minutes
Encyclopedia Britannica Education Corporation

COMPUTERS IN YOUR LIFE
Video
Association for Computing Machinery
Instructor's Computer Directory

COMPUTER INDUSTRY
16 mm film, 11 min.
Journal Films, Inc.

COMPUTERS, SPIES, AND PRIVATE LIVES
16 mm film, 57 minutes
Time Life Multimedia

COMPUTERS, THE FRIENDLY INVASION
16 mm film, 19 minutes
Walt Disney Films

COMPUTERS, THE INSIDE STORY
16 mm film, 19 minutes
Churchill Films

COMPUTERS, TOOLS FOR PEOPLE
16 mm film, 19 minutes
Churchill Films

MANAGING FOR SUCCESS: CAREER PLANNING
Career Aids, Inc.
Apple II, IIe or IIc; IBM PC

SECTION VI: SOCIAL IMPLICATIONS

UNIT I: EFFECTS ON SOCIETY

UNIT OBJECTIVE:

Students will describe the issues related to responsible use of computer systems, appraise the social ramifications of computer usage by society, identify responsible practices in the use of computers, and identify the major job categories, experience and training needed for positions in the computer field.

STUDENT OBJECTIVES:

After completing this unit, the student will be able to:

1. Identify the major issues relating to computers and society
2. Point out the risks to privacy brought about by electronic storage of data
3. Describe the ethical and legal issues that have arisen as a result of the computer revolution
4. Explain the reasons for concern about reliability of software, hardware, and systems
5. Identify job categories and the experience and training needed for positions in the computer field.

GENERALIZATION:

Using a computer is like using a piece of powerful machinery such as an automobile. Most people use computers harmlessly and responsibly, but if the user is irresponsible, careless, or malicious, the effects of decisions and actions can be far reaching and damaging. As new hardware and software is assimilated into industry and other organizations, it follows that new jobs will evolve, and some old ones will become obsolete. Computers have caused so many changes in the way we live and work that society is totally dependent upon them (as it is on the automobile). The first step toward responsible use of computers is understanding the scope and implications of the relationship between society and technology.

UNIT OVERVIEW

- I. Issues--As computers do more and more work in society, new social issues and questions continue to emerge. Many questions arose during the period when large mainframes took over data management in banks, insurance companies, financial institutions, and other large corporations; others appeared with the proliferation of microcomputers. Some of the effects of computers are felt by all of us.

A. Dependency

1. Anyone who has had to wait for several minutes because "the computer is down" while trying to make a credit card purchase at a retail store knows what it means to be dependent on computers.
2. Not learning the status of a credit card account is minor, however, compared to the failure of the police or fire department emergency computer system, or an airline reservation system.
3. In the situations above, the manual substitute, or backup, is totally unsatisfactory, and these functions can be said to be "computer dependent."
4. There are dozens of ways in which our daily activities could be crippled by computer failure.

B. Computer crime

1. Along with new technologies have come new forms of crime.
2. The seriousness of computer crime varies: the student with a personal computer who accesses vital files causes a nuisance at best and endangers personal or national security, at worst.
3. More frequent are the crimes in which industrial secrets are stolen by competitors, or financial data is altered to the benefit of the criminal.

C. The nameless society

1. Can we accept being identified by a number instead of a name?
 - a. We are known to some organizations by our social security numbers, to others by our drivers license number, and, in addition, to others by an account number.
 - b. If we respond to a computerized billing error, we have no assurance that a human will ever see the response.
2. It is unclear what effects this namelessness will have on the quality of our lives, or where these effects will lead.

D. Rapid changes

1. Most adults over age 50 feel confused and inadequate in matters related to computers.
2. The changes that have taken place in the last ten years as a result of computers eclipse those of the previous twenty, and the computer advances forecast for the next two years are greater still.
3. Those contemplating a microcomputer purchase are sometimes hesitant because they fear their purchase might become obsolete before the monthly payments are completed.
4. The programs bought last month have probably already been replaced by updated versions. It is uncertain if we will be prepared for the changes that are ahead of us.

II. Responsible use--Working with computers frequently means being entrusted with confidential information, or with tremendous responsibility that might affect people getting their pay checks on time, crediting their house payments on time, or receiving accurate results from medical tests. There are several aspects of responsible computer use.

A. Confidentiality

1. Computer professionals at all levels come in contact with private or even secret data.
2. Just as medical personnel and lawyers must preserve the confidentiality of their patients' or clients' records, a data entry operator must not divulge data that passes across his desk or terminal.
3. After leaving one job for another, or even when fired from a job, knowledge about computer information must not be disclosed.
4. Computer information must remain the property of the employer.

B. Accuracy

1. Loss of data can occur due to many causes--anything from industrial sabotage to hardware failure.
2. The most frequent cause of erroneous data is careless behavior by employees. Inaccurate key entry, failure to follow procedures for verification, leaving a workstation unattended, and overlooking an item of data are all ways in which an employee can be responsible for errors.

III. Privacy

- A. When business was transacted using handwritten or typed documents, there was a high degree of control over the destination of copies of the information. Now, since computers process the data once it is entered, the control is less certain.
- B. The originator of the data, a person who filled out an employment application, for example, has little idea where the information will end up. Confidential data is processed by many organizations.
- C. Credit bureaus
 - 1. The sole purpose of these organizations is to keep up-to-date records on the financial activities of individuals and businesses.
 - 2. They get their data from member or affiliate businesses who subscribe to their services.
 - 3. A problem for the person holding the account is that inaccurate information can be difficult to remove from these credit bureau records.
 - 4. Sometimes it is easier for creditors to get information than it is for the individual concerned.
- D. Data banks
 - 1. There was once a proposal for a huge national data bank in which all the information about every citizen, gathered by all state and local agencies, would be stored.
 - 2. Using a social security number, any agency could have access to everything known about the owner of the number.
 - 3. The idea would save huge amounts of money because it would prevent much duplication of effort and would make information so much more accessible.
 - 4. Fortunately, several members of congress foresaw the plan as the serious threat to privacy that it was, and the data bank was never created. There are, however, many data bases within businesses and state and local governments that have a great deal of confidential data about persons. Improper access to these databases could be damaging.

- IV. Values and reliability of systems--When speaking of computer reliability, most people think only of the hardware. Systems, however, are made up of hardware, software, and people. Reliability, or lack thereof, can be a factor of any of these elements.

A. Hardware

1. Although computer breakdowns are not nearly as frequent as the public perceives them to be, hardware breakdowns do occur.
2. With mainframes, most organizations have a plan for backup operation of critical systems. The expense for the backup is usually justified by the importance and timeliness of the data.
3. When failures occur with microcomputers, the work can usually be transferred to another computer.
4. No matter what kind of a computer is used, there should always be a backup plan so that a hardware problem does not cripple the business operation.

B. Storage media

1. Diskettes, or fixed disks, are used for microcomputer storage.
2. In either medium, making backup copies of important data should be a regular activity, with the frequency of copying depending on the difficulty of recovering lost data.
 - a. When fixed (hard) disks are used, the copies should not be on the same disk.
 - b. Floppy disks should be inspected regularly for wear or flaws.

C. Software program

1. There is a saying that "There is no such thing as a program without bugs, only programs for which all the bugs have not yet been discovered."
2. Reputable software companies are responsive to users who have problems, and they often provide subscription support services to users.
3. As with storage, frequent backup copying is the best defense against software failure.

D. People

1. In large computer shops, several people are trained to do each job, and substitutes can step in when needed.
2. In an office using microcomputers, often only one person is assigned to a job, and if that person is ill or leaves, there is chaos while someone else learns the system.
3. Having formally written, precise, and detailed procedures for all jobs is the solution to this problem, but too often these procedures are not put in writing.

V. Legal and ethical issues--Most of these issues involve the question of who owns the data. Sometimes the answers are clearcut; other times they are not.

A. Data spying

1. Forms of illegal access to data--Most notable are the cases where unauthorized persons learn passwords or otherwise bypass security procedures in order to gain information from a competitor, or for personal gain.
2. This is most easily done when systems have teleprocessing capabilities to acquire or change information, and a personal computer or terminal can be used to dial up the computer. Industry must go to great lengths to improve password and logon procedures in order to prevent this kind of activity.

B. Hackers

1. Unlike the spy, hackers are knowledgeable computer experts whose objective is merely to break through security barriers as a challenge.
2. While only a few of these individuals actually engage in unauthorized or illegal activities, these few give a bad name to the whole class of gifted experimenters.
3. Rather than steal data, a hacker is more inclined to destroy or alter it.

C. Employees or former employees

1. Personnel who have access to confidential data are subject to temptations to reveal or sell information.
2. Disgruntled or fired employees have been known to sell or give away data for revenge, or, when in a position to do so, remove or alter important records from the files.
3. Sometimes when an employee changes jobs, the knowledge about confidential information acquired in his/her former job may put him/her in an impossibly awkward position.

BCAI/Social Implications /Effects on Society/UNIT OVERVIEW

D. Copyright laws

1. The courts have ruled that computer programs are protected under the copyright laws.
2. The problem is that programs, like audio and video tapes, are easy to copy, making the law difficult to enforce.
3. Some publishers have gone to great lengths to insert special routines into their software to prevent illegal copying. NO method has been foolproof, and programs to break the copy protection routines are as common as the protection routines themselves.
4. Other publishers rely on the honor system, hoping that legitimate users will appreciate the trust which permits them to protect their own interests by making archival backups.
5. Currently the trend among major software companies is to offer unprotected versions.

VI. Job categories--There is no clear-cut set of categories into which every job fits neatly, but there are general groupings which can be used for career planning.

A. New jobs are continually appearing, new classifications may evolve, and sometimes existing classifications change or even disappear.

1. Anyone planning a career in the computer field should be prepared for change.
2. It is not possible to train for a computer job and expect to be prepared for one's entire working life.
3. Learning and retraining are major components of a career with computers.

B. Categories of computer-related jobs

1. Computer programmer
 - a. Not long ago, "programmer" was the career goal of most computer enthusiasts, and the demand for trained professionals was great.
 - b. The major roadblock in obtaining employment was the difficulty of getting that first job.
 - c. So many unqualified people were seeking jobs, that employers were wary, and they preferred to hire someone who had proven experience.

- d. The kinds of programming jobs have changed a great deal, and a person with a degree from a recognized institution seldom has trouble getting their first job.
 - (1) Applications programmer is the job that is most often associated with the word "programmer," because it is the most visible programming area.
 - (a) Application programmers must know more than just how to program. Their knowledge must also relate to the industry or field in which they work. Even the most talented programmer needs other areas of expertise in order to market his/her skills.
 - (b) For example, a programmer for a bank must have training or experience in the banking industry.
 - (2) The systems programmer's job is to write software routines that work with the operating system and hardware devices that are connected to the computer in order to make everything work together correctly and efficiently. Systems programmers usually have previous programming experience, and their knowledge focuses on the computer itself.
 - (3) Software developers often combine the knowledge of applications programmers and systems programmers. They write programs to fit specific hardware; programs that will then be sold to anyone who has that kind of hardware. Systems programmers must be very knowledgeable about existing applications software, as well as needs of end users.
- 2. Computer operator positions are not as clearly defined as they used to be because computers now come in so many different sizes.
 - a. A microcomputer does not require a separate person as an operator, but large mainframes and many minicomputers do require an additional operator.
 - b. Types of computer operator positions
 - (1) Console operators are considered the lead operators. It is their responsibility to see that the work received is processed correctly and on schedule, with complete security of the data.
 - (a) Console operators work at a console terminal, from which messages and commands are exchanged.

- (b) Large mainframes serve many users at once, and it is not practical or wise to allow the users access to the control of the system.
 - (c) With very large installations, there are entire staffs of operators (sometimes two or even three separate, daily shifts) to supervise the system.
 - (2) Peripheral operators are responsible for printers, tape drives, and other devices connected to the system in a large shop. Their job duties include mounting paper forms, tapes, disk packs, changing ribbons, and maintaining the equipment. In a small shop, the console operator might take care of these tasks him/herself.
 - (3) Data clerks go by different names, such as data control clerk. Their jobs consist mostly of recordkeeping related to the jobs that are scheduled to be run on the system. Data clerks are usually considered the lowest level of the operator jobs.
 - (4) Librarians are in charge of the magnetic tapes and/or disks that are used for storing programs and data.
 - (a) Like book librarians, their duties are largely clerical, but a knowledge of the program classifications and shop procedures is necessary.
 - (b) Librarians are responsible for getting the right tape or disk on the system at the time it is needed.
- 3. Data input and output positions are often entry level jobs for which the worker does not need any more than a general understanding of computers.
 - a. Usually data input/output employees work at a terminal or workstation, and may not ever see the computer with which they are communicating.
 - b. Types of data input/output positions
 - (1) The job title "keypunch operator" has been replaced with the title "data entry operator" since the method of data entry is no longer done with keypunch machines. Data entry jobs are something like typists' positions, except that since data is probably being entered directly into a computer, the data entry operators must know enough about the system to do the editing and error interpretation.

- (2) Terminal operators are similar to data entry operators except that terminal operators communicate two ways with the software, and the job usually includes other duties related to the specific applications. Examples of terminal operator jobs are dispatchers, university admissions clerks, or hotel chain reservations clerks.
- 4. Management-level jobs mean that those in these positions usually have greater responsibility and require more experience and training.
 - a. Systems analysts are usually higher level job titles, and their duties are sometimes combined with those of applications programmers.
 - (1) The analyst plans the overall procedures and programs that will be used to accomplish needed work.
 - (2) Frequently he/she will lead or be part of a team of personnel who will design all phases of a specific project.
 - (3) Analysts usually have experience as programmers, but they must also be familiar with the structure and operation of the organization as a whole.
 - (4) Systems analysts are usually the ones who communicate with management.
 - b. Database managers are considered specialist positions because these jobs call for advanced knowledge of data organization and storage.
 - (1) The database manager is a position of considerable responsibility because there is sensitive or proprietary data involved, and the functioning of other departments often depends on timely access to information.
 - (2) Basically, the database manager is charged with custodial responsibility for all the data. His/her job is to ensure that only the authorized people can access data when needed.
 - c. Microcomputer specialist positions are of fairly recent origin, and the title does not mean the same thing in all places.
 - (1) Microcomputer specialist positions most often combine the duties of supervisors and consultants.

- (2) Microcomputer specialists train other employees in the use of microcomputers and software, and are available for trouble-shooting or answering technical questions.
 - (3) They may have authority over the room or lab where the microcomputers are used.
 - d. Data communications specialists have expertise in the intricacies of managing a computer network (communication by telephone or other carrier between computers), and they require specialized training in hardware, software, and communications protocol.
 - (1) Any time new hardware or software is installed, there are problems which arise in interfacing all elements.
 - (2) The communications specialist has the kind of knowledge to solve these problems.
- 5. Other computer-related jobs are those positions that do not fit into any of the above groupings, but are directly related to the computer field.
 - a. Word processing jobs are often treated separately because they are limited to a single area of computer application. Many times word processing is done on special, dedicated equipment. Often, however, the newer software packages make microcomputers ideal for word processing.
 - b. Computer sales positions can be the highest income-producing career field of all, but too often those in sales are inadequately trained in the technical and software areas of the industry. In practice, salespersons frequently get into computer sales by chance, and then have to learn about their products on the job.
 - c. Computer technicians require extensive training that begins in the electronics field rather than business. Good technicians often know quite a bit about programming and computer applications.
 - (1) Technicians usually are the people who install and service hardware.
 - (2) They usually work for a computer manufacturer or vendor, but some corporations maintain their own staff of technicians.

BCAI/Social Implications /Effects on Society/UNIT OVERVIEW

VII. Preparation for the various computer-related jobs can be very different even though they all have a computer as the common element.

A. Education

1. Positions in the computer field normally require a high school diploma.
2. Those jobs that require a college degree include programmer, systems analyst, database manager, communications specialist, and microcomputer specialist.
3. Many corporations seek college graduates for lead operators, but some organizations will accept an associate degree from a community college for most of the job categories that normally require an upper-level college degree.

B. Training

1. Before computer training was generally available in schools, employers expected to pay employees to learn while on the job.
2. It was common practice to send staff members to concentrated workshops (lasting from two to ten days) in order to learn how to use specific hardware or software.
3. This is still done, but now employers are much less likely now to hire someone who has no training or experience. Today they select an applicant who possesses the skills necessary for the job, then they send him/her for additional training to learn new hardware or software.

C. Experience

1. New graduates, in the midst of searching for a job, often report that every company is looking for experienced people, but nobody is willing to give graduates a chance to gain necessary experience.
2. It is true that, in the computer industry, the high turnover and aggressive competition for good, experienced employees makes it more difficult for the newcomer to obtain his first job.
3. The solution often is to accept a position at lower salary than one believes his/her skills are worth in order to gain the experience that is the ticket to a better job.

VIII. Microcomputer-related careers--While microcomputers are frequently a part of any of the computer positions discussed above, there are many jobs not specifically described as computer positions that involve frequent use of microcomputers. It is impossible to identify these jobs by their titles because the titles might be as general as secretary, payroll clerk, bookkeeper, or inventory manager. The use of microcomputers in offices today is so extensive that applicants are wise to mention any such skills in their resumes.

MAJOR ISSUES RELATING TO COMPUTERS AND SOCIETY

Project 1

INSTRUCTIONS: List and describe the major issues related to computers and society.

Project 2

INSTRUCTIONS: Take one item or idea that has been changed through the advent of computers. Find pictures and draw illustrations representing when the item was first invented and the changes that have taken place. Share your ideas with the class.

RISKS TO PRIVACY

INSTRUCTIONS: Write a brief report on one of the following topics:

Fair Credit Reporting Act of 1970
Freedom of Information Act of 1970
Federal Privacy Act of 1974
Other topics suggested by your teacher

COMPUTER ETHICS SURVEY

Project 1

INSTRUCTIONS: Answer the following questions according to your own attitude. There may not be a single, correct answer to these questions.

1. The worker at the desk next to yours is processing payroll data on his/her microcomputer. He/she goes on a coffee break, leaving the program and data still on the screen. Should you:
 - a. Turn off the computer so nobody will see the data?
 - b. Read whatever you can from his/her data, but leave the screen the way you found it?
 - c. Tell the supervisor that this worker is being careless with confidential data?
 - d. When the worker returns, remind him/her that he/she is risking loss or disclosure of sensitive data.
2. There is a piece of software that you very much want, but it costs more than you can afford. While in a computer store, you see the desired disk on the table beside one of the demo systems. What would you do?
 - a. Entertain yourself with the program for a little while, then put it back where you found it.
 - b. Copy the program, before the salesperson comes by, on one of the blank disks you just purchased.
 - c. Slip the disk in your pocket and leave.
 - d. Take the disk to an employee and explain that it was left in an unsafe place.
3. A friend who is very clever with computers has been playing around with a modem to access the systems at universities and businesses. He/she says it's their fault if their security is so poor that he/she can gain access. What would you do?
 - a. Nothing. It's none of your business.
 - b. He/she's breaking the law. Call the police.
 - c. Notify his/her parents that he/she is heading for trouble.
 - d. Tell him/her you do not approve, then stay away.
4. A classmate brings a popular new game disk to school and offers to make a copy for you. What would you do?
 - a. Thank him/her and give him/her one of your games in return.
 - b. Thank him/her, but tell him/her you'd rather not have it.
 - c. Report him/her to the teacher for copyright violation.
 - d. Take it, but promise not to reveal where you got it.
5. You see your teacher making a copy of a commercial program for another teacher. What should you do?
 - a. Nothing. It's none of your business.
 - b. Ask the teacher if it's okay for him/her to be copying.
 - c. Report the incident to the principal.
 - d. Ask for a copy for yourself. If it's okay for teachers, it must be okay for students.

BCAI/Social Implications /Effects on Society/ACTIVITY THREE (Continued)

6. A friend asks for a copy of a program you just bought. What would you do?
 - a. He's/she's a good friend. Make him/her a copy.
 - b. Ask him/her to split the cost with you, then make the copy.
 - c. Tell him/her you do not approve of copying.
 - d. Say you are too busy now, but will do it later. Hope he/she will forget to ask again.
7. Because of your job, you have access to private financial data about your employer. Your favorite uncle asks you some questions about the private data. What would you do?
 - a. Tell him what he wants to know because he's part of your family.
 - b. Explain that your employer trusts you not to reveal things about the business.
 - c. Give him inaccurate information so that no harm is done.
 - d. Tell him, but warn him you could lose your job if word got out that you told.
8. After entering data all day, you realize you mixed up two pages. It is unlikely that the error will be traced back to you. What would you do?
 - a. Stay overtime and try to correct the error.
 - b. Say nothing, and deny knowledge if asked about it later.
 - c. Make up an excuse about a problem with the computer.
 - d. Ask your supervisor what to do.
9. You work with a database, and have been instructed to make a backup disk twice a day. In the five months you have worked there, no problems have occurred, and you are beginning to feel that you are wasting your time with the backups. What should you do?
 - a. Start making weekly backups instead of two a day.
 - b. Tell your supervisor that his/her procedures are too conservative, and should be changed.
 - c. Keep making two a day. Someday you'll be glad.
 - d. Pretend to make the backups, but don't really do it.

COMPUTER ETHICS AND LEGAL ISSUES

Project 2

INSTRUCTIONS: Research the computer ethics and legal issue areas in current magazines. Collect three articles on these issues.

Project 3

INSTRUCTIONS: From your reading, write a short paper discussing the copy-protection issues. Include information on software privacy and on-site licensing.

SOFTWARE, DATA, HARDWARE, AND SYSTEMS

Project 1

INSTRUCTIONS: Describe the responsibility that an employee has with regards to software security.

Project 2

INSTRUCTIONS: Research current magazine articles and write a brief paper on ways of preventing theft or alteration of data.

Project 3

INSTRUCTIONS: Prepare a security checklist for your own personal computer system and software.

COMPUTER JOB CATEGORIES, TRAINING, AND EXPERIENCE

Project 1

INSTRUCTIONS: Match the following major computer jobs in Column II with their responsibilities in Column I.

COLUMN I		COLUMN II	
_____ 1.	Considered the lead operator	A.	Applications programmer
_____ 2.	Similar to a data entry operator	B.	Computer technician
_____ 3.	The most visible programming job	C.	Database manager
_____ 4.	Responsible for changing ribbons and tapes; works primarily in a large shop	D.	Console operator
_____ 5.	Higher level job category	E.	Word processor
_____ 6.	Concentrates on the computer itself	F.	Data communications specialist
_____ 7.	Used to be called a keypunch operator	G.	Systems analyst
_____ 8.	Specialist in data organization	H.	Terminal operator
_____ 9.	Primary duty is recordkeeping	I.	Computer sales
_____ 10.	Must consider applications and hardware	J.	Systems programmer
_____ 11.	Responsible for managing a computer network	K.	Data entry operator
_____ 12.	In charge of magnetic media	L.	Software developer
_____ 13.	One of the most recent job categories	M.	Librarian
_____ 14.	Highest paid computer position	N.	Peripheral operator
_____ 15.	Starts out in the electronics field	O.	Microcomputer specialist
		P.	Data clerk

Project 2

INSTRUCTIONS: Using the Occupational Outlook Handbook and other current sources, enter the following information for each category of the computer jobs listed below. Use the forms provided.

JOB TITLE
SALARY RANGE
TRAINING REQUIREMENTS
EDUCATION NEEDED
EXPERIENCE NEEDED

Data Entry Operator

Applications Programmer

Systems Programmer

Systems Analyst

Console Operator

Database Manager

Data Clerk

Data Communications Specialist

COMPUTER JOB INFORMATION SHEET

JOB TITLE:

SALARY RANGE:

TRAINING REQUIREMENTS:

EDUCATION NEEDED:

EXPERIENCE NEEDED:

STUDENT NAME _____

Project 3

INSTRUCTIONS:

Collect newspaper want ads for five (5) different jobs that require microcomputer-operating skills. Mount the ads that you find on this activity sheet. Prepare to describe these positions to the class.

COMPETENCY TEST

INSTRUCTIONS: Answer the following questions.

1. Give two examples of how we have become dependent upon computers. For each example, discuss the problems that would result if the computer were to go down (be out of service).
 - a.
 - b.
2. What new forms of crime have arisen because of the widespread use of computers?
3. List three advantages and three disadvantages of using numbers rather than names as a means of identification.
4. What are some of the fears people have regarding the rapid changes in the computer field?
5. In what way are computers a threat to privacy?

BCAI/Social Implications /Effects on Society/COMPETENCY TEST/ (Continued)

6. Identify the four components of a data processing system which affect computer reliability.
7. Give one example of how microcomputers are used to gain illegal access to data.
8. Why are computer professionals who change jobs a potential risk to previous employers?
9. What kind of problems are computer hackers most likely to cause?
10. How do software publishers attempt to enforce copyright laws?
11. List three entry-level jobs for high school graduates.
 - a.
 - b.
 - c.
12. List three jobs that usually require a college degree.
 - a.
 - b.
 - c.

BCAI/Social Implications /Effects on Society/COMPETENCY TEST (Continued)

13. List three jobs that normally require similar work experience.
 - a.
 - b.
 - c.
14. What is meant by the term *entry-level position*?
15. What job would allow a person to work at night?
16. What position offers the highest potential income?
17. What job requires the greatest knowledge of hardware and operating systems?
18. What job has replaced the position of keypunch operator?
19. What job requires training in electronics?
20. What employee is responsible for communicating with management about computer procedures and applications?

COMPETENCY CHECKLIST

ESSENTIAL ELEMENT: 75.87(e)(6)(A)(B)

The student will be provided opportunities to: observe and/or participate in computer activities in business and industry and understand responsibilities and procedures involved in computer operations with individuals working in the field;

OBJECTIVE:	Students will describe the issues related to responsible use of computer systems, appraise the social ramifications of computer usage by society, identify responsible practices in the use of computers, and identify the major job categories, experience, and training needed for positions in the computer field.	MASTERY	NON MASTERY
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- | | | | |
|----|---|-------|-------|
| 1. | Identify the major issues relating to computers and society. | _____ | _____ |
| 2. | Point out the risks to privacy brought about by electronic storage of data. | _____ | _____ |
| 3. | Describe the ethical and legal issues that have arisen as a result of the computer revolution. | _____ | _____ |
| 4. | Describe the reasons for concern about reliability of software, hardware, and systems. | _____ | _____ |
| 5. | Identify job categories and the experience and training needed for positions in the computer field. | _____ | _____ |
| | | _____ | _____ |

STUDENT NAME _____

SECTION VI: SOCIAL IMPLICATIONS

UNIT II: FUTURE IMPLICATIONS

UNIT OBJECTIVE:

Students will identify future trends of hardware and software in the computer industry and other related developments.

STUDENT OBJECTIVES:

After completing this unit, the student will be able to:

1. Describe the future trends of hardware and software in the computer industry
2. Identify new emerging technologies

GENERALIZATION:

New hardware, software, and communications techniques are being developed and refined daily. The business personnel of today will not be performing their jobs the same way they have in the past because of the impact on technology.

UNIT OVERVIEW

- I. Hardware advances
 - A. Voice synthesis
 - 1. Voice synthesis is used presently. A form of voice synthesis is accessed by dialing the "time and temperature" number.
 - 2. Almost any computer may be able to verbalize with its user in the future.
 - B. Voice-recognition computers
 - 1. Recognize the spoken word as easily as the typed commands
 - 2. Very important uses for the handicapped
 - 3. When technology improves, users will no longer have to learn special commands or languages for communications.
 - 4. The computers themselves will be able to understand what the user says and identify the user through the use of voice patterns.
 - 5. Voice-recognition computers are an important development because they will provide access security.
 - a. A voice pattern is the same as a fingerprint--it is very individualized.
 - b. This development could take the locks off houses--one would go up to the door and talk to it. If the computer recognized the voice pattern, then the door would be unlocked.
 - C. Computer vision is also being developed.
 - 1. This will be a big asset to the robotics industry.
 - 2. Computer vision could link robots in manufacturing with the computer used in design.
 - a. Assist with quality control
 - b. Recognize tools and make sure the parts fit properly
 - c. May allow the robots to work in places that humans cannot work
 - D. Digitizers that recognize handwriting will ultimately handle massive storage of large volumes of material.

- E. Extremely high-quality monitors will be available allowing images to be similar to a photograph. Therefore, we may read a book on the monitor or access music and photographs with fine-tuned synthesis and resolution.
 - F. Fiber optics will be further developed and will continue to have impact on computer communications. These developments will continually change the way information is going to be sent and received. It will also affect the speed and quality of the process.
 - G. Computers will make the same type of transition as the calculator. They will greatly decrease in size and will increase in speed. One way of increasing speed is through parallel processing which uses many microprocessors.
 - 1. Each microprocessor performs a part of the work.
 - 2. All are working on the applications at the same time.
 - 3. When this happens, the work takes only a fraction of the time.
 - H. Optical computers will perform at the speed of light and will even use light to perform its calculations. They will be extremely powerful storage devices and will be very small.
 - I. Storage improvements will include the amount of storage on floppy disks. They will be able to hold almost as much as the current hard disk drives. Then, the hard disk drives will hold extensive amounts of data.
 - 1. Some say in the early 1990s the floppy disk will be considered as the punch card of the eighties.
 - a. Because of the increase in the use of LAN software and programs recoded on ROM modules
 - b. The floppy disk will be considered a relic.
 - 2. Magnetic bubble memory
 - 3. Using compact disks (CD)
- II. Computer software
- A. Basically, the new advances will make the computer easier to use.
 - B. New features that are being developed
 - 1. Computers using natural language
 - 2. Improvements in the ways of communication

3. A complete field is dedicated to artificial intelligence.
 - a. This is the capability of computers to have many of the characteristics of the human brain, including the ability to learn from experience.
 - b. Allows decisions to be made
 - c. There will be much interaction between humans and machines. The capabilities for anticipating user needs and devising programs to meet them will be expanded.
4. Expert systems use artificial-intelligence technology to analyze information by following rules.

HARDWARE AND SOFTWARE OF THE FUTURE

INSTRUCTIONS: Describe five hardware developments and two software developments.

NEW EMERGING TECHNOLOGIES

INSTRUCTIONS:

Using current computer periodicals, research one of the new technologies. Write a one-page paper describing how it will affect society. Describe the process to the class.

COMPETENCY TEST

INSTRUCTIONS: Write a two-page paper discussing three technologies of the future. At least one technology should be from your research.

COMPETENCY CHECKLIST

ESSENTIAL ELEMENT: 75.87(e)(6)(C)

The students will be provided opportunities to: identify emerging computer tools and understand their impact on business and industry.

OBJECTIVE: Students will identify future trends of hardware and software in the computer industry and other related developments.

	MASTERY	NON MASTERY
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- | | | |
|--|-------|-------|
| 1. Describe the future trends of hardware and software in the computer industry. | _____ | _____ |
|--|-------|-------|

- | | | |
|--|-------|-------|
| 2. Identify new emerging technologies. | _____ | _____ |
| | _____ | _____ |
| | _____ | _____ |

STUDENT NAME _____

UNIT WILL BE PREPARED DURING THE 1988-89 PROJECT YEAR

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APPENDIX A
LIST OF PUBLISHERS

ADDISON-WESLEY PUBLISHING CO., INC.
Reading, MA 01867

AECT PUBLICATIONS SALES
1126 Sixteenth St. N.W.
Washington, DC 20036

ALLYN & BACON
College Division
Rockleigh, NJ 07647

AMERICAN BANKERS ASSN.
1120 Connecticut Ave. NW
Washington, DC 20036

ANAHEIM PUBLISHING CO.
2632 Saturn Street
Brea, CA 92621

ARCO PUBLISHING, INC.
Educational Division
215 Park Avenue South
New York, NY 10003

ASHTON-TATE PUBLISHING GROUP
20101 Hamilton Avenue
Torrence, CA 90502-1319

AVA RESOURCES
2020 N. 14th Street
Arlinton, VA 22201

BANTAM BOOKS
666 Fifth Avenue
New York, NY 10103

THE BENJAMIN/CUMMINGS PUBLISHING
CO., INC.
2727 Sandhill Road
Menlo Park, CA 94025

BOBBS-MERRILL EDUCATIONAL PUBLISHERS
4300 W. 62nd. Street
Indianapolis, IN 46268

BOYD AND FRASER PUBLISHING
20 Park Plaza
Boston, MA 02116

ROBERT J. BRADY, CO.
A Prentice-Hall Co.
Bowie, MD 20715

BROOKS/COLE PUBLISHING CO.
540 Arago Street
Monterey, CA 93940

WILLIAM C. BROWN PUBLISHING
2460 Kerper Blvd.
Dubuque, IA 52001

CAREER AIDS, INC.
20417 Nordhoff St.
Dept K 65
Chatsworth, CA 91311

CBS COLLEGE PUBLISHING
383 Madison Avenue
New York, NY 10017

CHILTON BOOK COMPANY
School and Library Dept.
Chilton Book Company
Radnor, PN 19089

CHRONICLE GUIDANCE PUBL., INC.
Aurora Street Extension
P.O. Box 1190
Moravia, NY 13118-1190

COLLEGE BOARD PUBLICATIONS
The College Board
888 Seventh Ave.
New York, NY 10106

CURRICULUM PUBLICATIONS
CLEARINGHOUSE
46 Horrbin Hall
Macomb, IL 61455

CURTIN & LONDON, INC.
135 West 50th Street
New York, NY 10020

DATAPRO
1805 Underwood Blvd.
Delran, NJ 08075

DELMAR PUBLISHING INC.
2 Computer Drive West
Box 15-015
Albany, NY 12212

THE DRYDEN PRESS
P.O. Box 36
Lavallette, NJ 08735

EDITS
P.O. Box 7234
San Diego, CA 92107

EDUCATIONAL FILMSTRIPS
1405 19th Street
Huntsville, TX 77340

ESP, INC. PRODUCTIONS
Jonesboro, AR 72401

GLENCOE PUBLISHING CO.
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Dallas, TX 75247

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1914 Association Drive
Reston, VA 22091
The journal features articles for teachers of secretarial programs, typewriting, accounting, clerical programs, basic business, as well as economics, marketing and distribution, communication, and data processing.

Business Horizons

Graduate School of Business
Indiana University
Bloomington, IN 47405
Articles by academics and business people on significant business issues, trends, and research projects.

Delta Pi Epsilon Journal

Delta Pi Epsilon National Office
Gustovus Adolphus College
St. Peter, MN 56082
Devoted to research articles dealing with theory, practice, and research in business education.

Journal of Business Education

Heldref Publications
4000 Albemarle St. NW
Washington, DC 20016
A journal dealing with business education from high school to community college level. Contributors are principally teachers and academics.

VOCED

formerly American Vocational Journal
2020 N. 14th Street
Arlington, VA 22201
The journal of the American Vocational Association published for teachers, administrators, counselors, and laypersons involved in the task of preparing people for work. The journal gives a balanced view of both the theoretical and practical aspects of vocational education.

NEWSLETTERS

The Office Professional

1316 Sam Bass Circle
Round Rock, TX 78664
Provides reliable information about office systems and procedures, secretarial methods, management thinking, and office technology. Also features articles on communication techniques, professional human relation skills, and the latest approaches to career development.

Open Entries

The Center for Studies in
Vocational Education
Florida State University
Stone Building
Tallahassee, FL 32306
A nationwide communication link for educators involved in competency-based vocational education that encourages exchange of information on competency-based learning materials, development of new guides, packets, audiovisual materials and computer-based resources.

Texas Business Educator

Texas Business Educational Assn.
P.O. Box 15915
Austin, TX 78752

A semiannual bulletin of the activities of the Texas Business Education Association, plus articles of current interest to business educators.

Viewpoints in Business Education

Milady Publishing Corp.
3839 White Plains Road
Bronx, NY 10467

A teaching methods and materials newsletter for business education teachers.

The Balance Sheet

South-Western Publishing Co.
11310 Gemini Lane
Dallas, TX 75229

The publication is free to teachers and features articles of current interest relating to business and economic course offerings at the high school and postsecondary levels.

Modern Office Procedures Magazines

Pent/IPC

1111 Chester Avenue
Cleveland, OH 44114

Business/office market magazine featuring office procedures and utilization of new technological developments in computers, business machines, furnishings, and supplies.

The Office

Office Publications, Inc.
1200 Summer Street
Stamford, CT 06904

The magazine discusses many aspects of office practice and management for both executives and office managers. Articles include topics such as systems analysis, programming, employee relations, applications of computers, and product/equipment announcements.

Office Guide

Bureau of Business Practices
24 Rope Ferry Road
Waterford, CT 06385-9985

Issued twice each month, the six-page publication offers office hints and shortcuts that can be used as a training tool to upgrade office personnel.

Office Guide for Working Women

Bureau of Business Practice
24 Rope Ferry Road
Waterford, CT 06385-9985

The magazine offers general articles and regular features on typing, vocabulary, and grammar applicable to office workers and/or secretarial science students.

Office Talks

Bureau of Business Practice
24 Rope Ferry Road
Waterford, CT 06385-9985

Featuring office techniques, personal appearance, office etiquette, cosmetics, and hygiene for secretaries.

P.S. for Professional Secretaries

Bureau of Business Practices
24 Rope Ferry Road
Waterford, CT 06385-9985

Helps office personnel to perform their tasks more quickly, easily, and efficiently.

The Secretary

Professional Secretaries Int.
301 East Armour Blvd.
Kansas City, MO 64111-1299

A publication for professional secretaries featuring articles by management, business educators, and secretaries that stresses improving knowledge and ability in secretarial expertise.

Today's Office

Hearst Business Communications
UTP Division
645 Stewart Avenue
Garden City, NY 11530

A professional business magazine covering the office.

MAGAZINES

ADMINISTRATIVE MANAGEMENT

P. O. Box 544
Martinesville, NJ 08836

APPLE ORCHARD

908 George Street
Santa Clara, CA 95050

BUSINESS SOFTWARE

M & T Publishing
P.O. Box 27925
San Diego, CA 92128

BYTE: THE SMALL SYSTEMS JOURNAL

70 Main Street
Peterborough, NH 03458

CLASSROOM COMPUTER LEARNING

Peter Li Inc.
2451 East River Rd.
Dayton, Oh 45439

COMPUTE!

P. O. Box 5406
Greensboro, NC 26403

COMPUTERWORLD

International Data Corporation
60 Austin Street
Newton, MA 02160

CREATIVE COMPUTING: THE MAGAZINE OF RECREATIONAL AND EDUCATIONAL COMPUTING

P. O. Box 789-M
Morristown, NJ 07968

DATAMATION

Cahners Publishing Co.
249 West 17th St.
New York, NY 10011

FAMILY COMPUTING

Scholastic Inc.
351 Garver Rd.
P.O. Box 2700
Monroe, OH 45050-2700

INTERFACE AGE: MICROCOMPUTING FOR HOME AND SMALL BUSINESS

13913 Artesia Blvd.
Cerritos, CA 90701

KILOBAUD: THE SMALL COMPUTER MAGAZINE

Peterborough, NH 03458

PC MAGAZINE

39 East Hanover Avenue
Morris Plains, NJ 07950

PC WORLD

555 DeHaro Street
San Francisco, CA 94107

PERSONAL COMPUTING

50 Essex Street
Rochelle Park, NJ 07662

PERSONAL PUBLISHING

Box 390
Itasca, IL 60143

POPULAR COMPUTING

70 Main Street
Peterborough, NH 03458

RUN: THE COMMODORE 64/128 USERS GUIDE

C. W. Communications
P.O. Box 954
Farmingdale, NY 11737

SOFTWARE DIGEST

EDP Services, Inc.
7620 Turtle Turnpike
Annadale, VA

SOFTWARE REVIEW
Microform Review, Inc.
520 Riverside Drive
Westport, CT 06880

*THE TECHNOLOGICAL HORIZONS IN
EDUCATION JOURNAL*
Information Synergy Inc.
2626 South Pullman
Santa Ana, CA 92705

TEXAS COMPUTING
17806 Davenport, Suite 105
Dallas, TX 75252
(214) 931-0157

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APPENDIX B

OFFICE EDUCATION

OCCUPATIONAL SPECIFIC COURSES (GRADES 11 & 12)

BUSINESS INFORMATION PROCESSING (1-3 credits)

Introduces the basic concepts and skills for production of business documents and correspondence. Special emphasis is placed on automated management of business records, database management information flow, electronic mail, desktop publishing, electronic bulletin boards, graphics, and on-line information services. This is an occupational specific course that prepares the student for employment or advanced standing at the post secondary level.

OFFICE ADMINISTRATION (1-3 credits)

Includes advanced concepts and skills necessary for in a general office position through a simulated office environment. Special emphasis is placed on keyboarding, records management, communications, operation of office machines, and the electronic production of business documents. This is an occupational specific course that prepares the student for office employment.

BUSINESS COMPUTER APPLICATIONS I (1-3 credits)

Introduces the basic concepts and skills related to general data processing. Special emphasis is placed on basic computer operations, information processing, applying the general capabilities of database management, and demonstrating basic electronic spreadsheet concepts and other business application software. This course is designed to lay a foundation for further occupational computer applications instruction in business computer applications II.

BUSINESS COMPUTER APPLICATIONS II (1-3 credits)

Includes advanced concepts and skills related to general data processing. Special emphasis is placed on teleprocessing and integrated software systems, computer operations, computer generated graphics, algorithmic approaches to problem solving, and programming. This course is an occupational specific course that prepares the student for employment in a business computer occupation or advanced standing at the post secondary level.

BUSINESS COMPUTER PROGRAMMING I (1-3 credits)

Introduces the basic concepts and skills related to business computer programming. Special emphasis is placed on programming concepts and language, programming methodology, skills related to data storage, and an awareness of programming applications for business. This course is designed to lay a foundation for further occupational specific business programming instruction.

BUSINESS COMPUTER PROGRAMMING II (1-3 credits)

Includes advanced concepts and skills related to business computer programming. Special emphasis is placed on bringing development efforts to full production status in environments and language commonly

used in development of commercial software for business applications. Concepts such as design, maintenance, testing, team development, and user documentation are included. This course prepares students for employment in a computer related occupation or advanced placement at the post secondary level.

CLUSTER COURSES (GRADES 10, 11, & 12)

MICROCOMPUTER APPLICATIONS (1/2 OR 1 credit)

Introduces basic concepts and skills related to micro-computer systems. Special emphasis is placed on word processing, data base design, electronic spreadsheet, and numeric data. Included will be introductions to new, emerging information processing tools such as telecommunications and integrated software, transporting of text and images, and desktop publishing. This course provides students with an overview of the various uses of information processing tools and skill development in using micro-computer-based tools for personal, academic, and/or employment.

OFFICE SUPPORT SYSTEMS (1/2 OR 1 credit)

Introduces the basic concepts and skills needed for general office position. Instruction and skill development are provided in keyboarding, filing, financial activities, office machines, and securing and maintaining employment. This course provides students with an overview and understanding of office skills for entry level employment or preparation for advancement into an occupational specific course.

BUSINESS FINANCIAL APPLICATIONS (1/2 OR 1 credit)

Introduces the basic concepts and skills necessary for employment in a financial institution. Special emphasis will be placed on banking operations, credit administration, types of loans, legal aspects of banking, and other financial institutions. This course provides the students with an overview and understanding of the banking industry which may be used for an entry level position or advancement into an occupational specific course.

*Students pursuing the advanced program may substitute this course in lieu of computer science.

CVAE/VEH COURSES (GRADES 7-12)

BUSINESS OFFICE SERVICES (1-3 credits)

Introduces basic concepts and skills needed for a general office position with concentration on the use of reprographic equipment, keyboarding, filing, and office machines. Special emphasis is placed on remediation in the areas of basic math and English usage, as well as securing and maintaining employment.

BUSINESS OFFICE CLERICAL (1-3 credits)

Introduces basic concepts and skills needed for a general office position with concentration on the use of keyboarding, filing, and office machines. Special emphasis is placed on remediation in the areas of basic math and English usage, as well as securing and maintaining employment.

APPENDIX C

COMMON ESSENTIAL ELEMENTS for all OFFICE EDUCATION PROGRAMS

75.87 Office Education

- (a) The elements in this subsection are common to office education programs and shall be included in each course at the appropriate level. They are described here to preclude repetition in each course. Every school offering office education shall provide courses which include the following essential elements:
- (1) Leadership concepts and skills. The student shall be provided opportunities to:
 - (A) demonstrate skills, characteristics, and responsibilities of leaders and effective group members;
 - (B) demonstrate a knowledge of parliamentary procedure principles;
 - (C) plan and conduct leadership activities; and
 - (D) prepare for effective citizenship and for participation in our democratic society.
 - (2) Concepts and skills related to successful employment and/or postsecondary training. The student shall be provided opportunities to:
 - (A) identify employment opportunities and preparation requirements in the chosen field;
 - (B) identify effective methods to secure and terminate employment;
 - (C) demonstrate effective communication skills both oral and written, and follow through on assigned tasks;
 - (D) demonstrate dependability and punctuality;
 - (E) demonstrate productive work habits and attitudes;
 - (F) understand the importance of taking pride in the quality of work performed;
 - (G) recognize the dignity in work;
 - (H) develop skills in planning and organizing work;
 - (I) apply required methods and sequences when performing tasks;
 - (J) apply principles of time management and work simplification when performing assigned tasks;
 - (K) identify ethical practices and responsibilities; and

- (L) understand the importance of the application of organizational policies and procedures.
- (3) Concepts and skills associated with entrepreneurship. The student shall be provided opportunities to:
 - (A) identify opportunities for business ownership;
 - (B) understand the risk and profit motive factor;
 - (C) understand the elements and advantages of the free enterprise system; and
 - (D) explain the role of small business in the free enterprise system.
- (4) Concepts and skills related to safety and safe working conditions. The student shall be provided opportunities to identify and apply safe working practices to all training situations.
- (5) Concepts and skills associated with human relations and personality development. The student shall be provided opportunities to:
 - (A) understand the importance of maintaining good health and proper appearance for effective job performance;
 - (B) understand oneself and others;
 - (C) exercise self-control;
 - (D) accept and use criticism;
 - (E) recognize basic human relationships as they relate to business success; and
 - (F) demonstrate characteristics for successful working relationships.
- (6) Concepts and skills related to personal and business management. The student shall be provided opportunities to:
 - (A) explain how management assists in reaching personal and family goals;
 - (B) explain the management process;
 - (C) describe the role of management in controlling stress;
 - (D) identify and understand personal checking accounts;
 - (E) identify and understand personal loan application processes;
 - (F) identify and understand different financial institutions;
 - (G) identify the role and functions of business management;
 - (H) understand the lines of authority; and
 - (I) identify effective supervisory techniques.

OFFICE EDUCATION ESSENTIAL ELEMENTS

OFFICE ADMINISTRATION

75.87

- (b) Office administration (one, two, or three units) shall include the following essential elements:
- (1) Concepts and skills involved in keyboarding in office administration. The student shall be provided opportunities to:
 - (A) recognize proofreader's marks and use them in editing;
 - (B) demonstrate the ability to apply basic touch keyboarding skills;
 - (C) demonstrate procedures necessary in keyboarding business documents; and
 - (D) demonstrate the ability to enter, manipulate, and retrieve data on a microcomputer.
 - (2) Concepts and skills necessary for records control and management in office administration. The student shall be provided opportunities to:
 - (A) identify correct usage in applying terminology and procedures for indexing, coding, and filing using the alphabetic, numeric, subject, and geographic system;
 - (B) identify, describe, and/or demonstrate procedures for controlling manual and automated records; and
 - (C) identify the procedures of handling incoming and outgoing mail.
 - (3) Concepts and skills necessary for the operation of office machines in office administration. The student shall be provided opportunities to:
 - (A) use the touch system on the electronic calculator to compute mathematical business problems, including petty cash, banking, and payroll accurately;
 - (B) identify correct procedures for producing legible copies; and
 - (C) produce accurate, legible business forms and business correspondence on the electronic typewriter and/or computer.
 - (4) Concepts and skills necessary for effective communication in office administration. The student shall be provided opportunities to:
 - (A) identify proper techniques in business telephone usage;
 - (B) prepare effective written communication using the document production cycle;
 - (C) identify and use language skills relating to business; and
 - (D) identify terminology relating to basic business, information processing, and computer applications.

OFFICE EDUCATION ESSENTIAL ELEMENTS

BUSINESS INFORMATION PROCESSING

75.87

- c) Business information processing (one, two, or three units) shall include the following essential elements:
- (1) Concepts and skills related to effective communication and production of business documents. The student shall be provided opportunities to :
 - (A) demonstrate proficiency in business English, spelling, and proofreading;
 - (B) identify and apply correct format for business correspondence and documents;
 - (C) demonstrate basic information processing concepts and processes to employ the appropriate steps in document production;
 - (D) demonstrate proficiency in transcription;
 - (E) identify and use computer-based tools for document production;
 - (F) demonstrate basic knowledge and usage of business machines; and
 - (G) identify proper techniques in business telephone usage.
 - (2) Concepts and skills related to business records management. The student shall be provided opportunities to:
 - (A) identify procedures for controlling manual records by applying terminology and procedures for indexing, coding, and filing alphabetically;
 - (B) identify and apply procedures for automated management of business records, at least including use of database management software for storage, retrieval, manipulation, selection, and reporting of records;
 - (C) identify business applications of electronic spreadsheets and understand and/or demonstrate fundamental concepts and operational procedures related to their use.
 - (3) Concepts and skills related to management of information flow out of, into, and within an office. The student shall be provided opportunities to:
 - (A) understand concepts related to computer-aided preparation and distribution of personalized correspondence, at least including use of mail merge and electronic mail;
 - (B) identify tools for preparing information for mass distribution, at least including desktop publishing, production of presentation graphics, and maintenance of electronic bulletin boards;

- (C) understand the concepts of using communication systems both for accessing remotely stored information (at least including use of on-line information services) and for transmission of outgoing information; and
 - (D) understand concepts related to transporting of images electronically.
- (4) Identify characteristics of contemporary office systems related to information processing and management. The student shall be given opportunities to:
- (A) observe office activity related to information processing and information management;
 - (B) discuss responsibilities and procedures involved in business information processing with individuals working in the field;
 - (C) read and discuss current literature related to business information processing; and
 - (D) identify emerging information processing tools and understand their impact on business information processing.

OFFICE EDUCATION ESSENTIAL ELEMENTS

BUSINESS OFFICE SERVICES

75.87

- (d) Business office services (one, two, or three units) shall include the following essential elements:
- (1) concepts and skills related to business office services. The student shall be provided opportunities to:
 - (A) identify and demonstrate image processing for duplicating;
 - (B) demonstrate the procedures and equipment used in completing layouts and masters for reprographics;
 - (C) identify and demonstrate the procedures used in operating reprographic equipment;
 - (D) identify and demonstrate the use of the machines used in bindery operations;
 - (E) demonstrate the ability to keyboard materials for duplication;
 - (F) demonstrate the ability to solve mathematical problems using the touch method on the electronic calculator;
 - (G) identify and use correct mailing procedures; and
 - (H) identify and practice the correct procedures in alphabetic filing.
 - (2) Concepts and skills related to the procedures of handling mail. The student shall be provided opportunities to identify and/or use correct mailing procedures.

OFFICE EDUCATION ESSENTIAL ELEMENTS

BUSINESS COMPUTER APPLICATIONS I

75.87

- (e) Business Computer Applications I (one, two, or three units) shall include the following essential elements:
- (1) Concepts and skills related to general data processing. The student shall be provided opportunities to:
 - (A) demonstrate comprehension of data processing terms;
 - (B) identify the major components of data processing;
 - (C) identify and apply the functions of an operating system;
 - (D) demonstrate the ability to enter, manipulate, and retrieve data on a computer terminal; and
 - (E) understand concepts of networked and multi-user configurations.
 - (2) Concepts and skills related to information processing. The student shall be provided opportunities to:
 - (A) demonstrate basic information processing concepts; and
 - (B) apply general capabilities of information processing tools and software.
 - (3) Concepts and skills related to spreadsheets. The student shall be provided opportunities to:
 - (A) demonstrate basic spreadsheet concepts; and
 - (B) apply general capabilities of spreadsheets.
 - (4) Concepts and skills related to database management. The student shall be provided opportunities to:
 - (A) demonstrate basic database concepts, procedures, and capabilities; and
 - (B) apply general capabilities of database management.
 - (5) Concepts and skills related to business application software. The student shall be provided opportunities to demonstrate the ability to use automated business application concepts, principles, and practices in realistic situations.
 - (6) Concepts and skills related to computer operations. The student shall be provided opportunities to:
 - (A) observe and/or participate in computer activities in business and industry;

- (B) understand responsibilities and procedures involved in computer operations with individuals working in the field; and
- (C) identify emerging computer tools and understand their impact on business and industry.

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OFFICE EDUCATION ESSENTIAL ELEMENTS

BUSINESS COMPUTER APPLICATIONS II

75.87

- (f) Business Computer Applications II (one, two, or three units) shall include the following essential elements:
- (1) Concepts and skills related to teleprocessing. The student shall be provided opportunities to:
 - (A) describe the basic components of a teleprocessing system;
 - (B) demonstrate an understanding of network organization; and
 - (C) understand and identify the use of teleprocessing system for data exchange in an actual business setting.
 - (2) Concepts and skills related to integrated systems. The student shall be provided opportunities to:
 - (A) understand and identify the advantages, capabilities, and functions of integrated software systems;
 - (B) manipulate data through the use of an integrated system; and
 - (C) use integrated systems to merge data from different applications.
 - (3) Concepts and skills related to graphics. The student shall be provided opportunities to:
 - (A) analyze and interpret business graphs and charts; and
 - (B) demonstrate graphic representation of data.
 - (4) Concepts and skills related to algorithmic approaches to problem solving. The student shall be provided opportunities to:
 - (A) demonstrate the ability to solve problems using appropriate analytical techniques; and
 - (B) demonstrate an awareness of the phases related to systems analysis and design.
 - (5) Concepts and skills related to applying logic to programming. The student shall be provided opportunities to:
 - (A) apply the appropriate analytical techniques to solving programming problems;
 - (B) translate the applied solution into a common programming or macro language; and
 - (C) demonstrate the ability to debug and audit a solution.

OFFICE EDUCATION ESSENTIAL ELEMENTS

BUSINESS COMPUTER PROGRAMMING I

75.87

- (g) Business Computer Programming I (one, two, or three units) shall include the following essential elements:
- (1) concepts and skills related to general data processing. The student shall be provided opportunities to:
 - (A) demonstrate comprehension of data processing terms; and
 - (B) identify the major components of data processing system.
 - (2) Concepts and skills related to hardware equipment utilization. The student shall be provided opportunities to:
 - (A) become familiar with operating computer hardware;
 - (B) categorize hardware according to size, application, and configuration; and
 - (C) demonstrate the ability to use basic operating systems.
 - (3) Concepts and skills associated with programming. The student shall be provided opportunities to:
 - (A) demonstrate the skills related to algorithmic approaches to problem solving;
 - (B) demonstrate an understanding of computer language concepts;
 - (C) translate problems into logical steps using appropriate analytical analysis techniques;
 - (D) translate solutions to a common programming language; and
 - (E) demonstrate an understanding of preparation and uses of process documentation.
 - (4) Concepts and skills associated with data storage. The student shall be provided opportunities to:
 - (A) demonstrate an understanding of the types of media for data storage;
 - (B) identify methods of storing data on storage devices;
 - (C) create and maintain a program to store and retrieve data from a file; and
 - (D) demonstrate knowledge of computer numbering systems and data representation on storage devices.

OFFICE EDUCATION ESSENTIAL ELEMENTS

BUSINESS COMPUTER PROGRAMMING II

75.87

- (h) Business Computer Programming II (one, two, or three units) shall include the following essential elements:
- (1) Concepts and skills related to application system development. The student shall be provided opportunities to:
 - (A) demonstrate a comprehension of the system development process;
 - (B) demonstrate a comprehension of the implementation process; and
 - (C) develop user documentation.
 - (2) Concepts and skills related to structured programming application. The student shall be provided opportunities to:
 - (A) develop an understanding of structured programming;
 - (B) identify the concepts of random and sequential files;
 - (C) translate solutions into major structural elements of a program;
 - (D) translate solutions into language statements for input, processing, and output; and
 - (E) develop ability to use an advanced operating system computer.
 - (3) Concepts and skills related to program testing. The student shall be provided opportunities to:
 - (A) develop test data and testing techniques;
 - (B) apply test data to programs run on the computer; and
 - (C) demonstrate the ability to debug and audit programs.
 - (4) Concepts and skills associated with software implementation and maintenance. The student shall be provided opportunities to:
 - (A) write documentation for maintaining a system;
 - (B) understand the process of implementing a system into production status; and
 - (C) develop an understanding of the programmer responsibilities in program maintenance.

OFFICE EDUCATION ESSENTIAL ELEMENTS

OFFICE SUPPORT SYSTEMS

75.87

- (i) Office support systems (1/2 or one unit) shall include the following essential elements:
- (1) Concepts and skills involved in keyboarding. The student shall be provided opportunities to:
 - (A) demonstrate the skill of keyboarding letters, memos, forms, and reports;
 - (B) apply appropriate procedures for proofreading and correcting errors; and
 - (C) demonstrate and identify information processing concepts in keyboarding.
 - (2) Concepts and skills necessary for filing. The student shall be provided opportunities to:
 - (A) demonstrate procedures used in alphabetic, numeric, subject, and geographic filing; and
 - (B) identify procedures used in electronic filing.
 - (3) Concepts and skills necessary for financial activities. The student shall be provided opportunities to:
 - (A) demonstrate the ability to maintain a checking account; and
 - (B) demonstrate the procedures involved in preparing a payroll and preparing tax reports.
 - (4) Concepts and skills necessary for processing mail. The student shall be provided opportunities to:
 - (A) identify the procedures involved in processing incoming and outgoing mail; and
 - (B) identify the procedures involved in transmitting mail electronically.
 - (5) Concepts and skills necessary for effective communications. The student shall be provided opportunities to:
 - (A) identify and use proper business techniques when using the telephone;
 - (B) prepare effective written communications; and
 - (C) identify and use proper language usage skills in business.

- (6) Concepts and skills necessary for effective understanding of business operations. The student shall be provided opportunities to:
 - (A) describe the role of business in the enterprise system; and
 - (B) identify the general responsibilities of employees.
- (7) Concepts and skills necessary for securing and maintaining employment. The student shall be provided opportunities to:
 - (A) demonstrate the skills necessary for job application and interview; and
 - (B) apply human relations skills and the ability to work with others.

OFFICE EDUCATION ESSENTIAL ELEMENTS

MICROCOMPUTER APPLICATIONS

75.87

- (j) Microcomputer applications (1/2 or one unit) shall include the following essential elements:
- (1) Fundamental concepts and operational skills related to microcomputer systems. The student shall be provided opportunities to:
 - (A) understand the background and uses for computer systems;
 - (B) demonstrate competency in touch keyboarding, including technique, speed, and accuracy;
 - (C) understand the components of computer systems, including hardware, operating environments, and application software; and
 - (D) demonstrate competency in microcomputer systems operation.
 - (2) Concepts and skills necessary for microcomputer-based document production, formatting, and proofreading, at least including use of word processing software and automated spellchecking software. The student shall be provided opportunities to:
 - (A) identify and use the terminology related to word processing;
 - (B) demonstrate the operational procedures used in document production and page layout; and
 - (C) employ appropriate steps in producing documents.
 - (3) Concepts and skills necessary for use of microcomputer-based storage, retrieval, manipulation, and reporting information, at least including use of database management software. The student shall be provided opportunities to:
 - (A) identify and use the terminology related to information management;
 - (B) demonstrate the operational procedures and techniques used in information management software;
 - (C) use microcomputer software to design databases, enter and manipulate information, and produce reports (including graphic display of summary reports); and
 - (D) conduct keyword database searches using logic operations such as AND, OR, and NOT.
 - (4) Concepts and skills necessary for use of microcomputer-based computation, analysis, planning, and reporting with numeric data, at least including use of electronic spreadsheets. The student shall be provided opportunities to:
 - (A) identify and use the terminology related to electronic manipulation of numeric data;

- (B) demonstrate operational procedures and techniques used with microcomputer software for processing numeric data;
 - (C) use microcomputer software for computation, analysis, planning, and reporting (including graphic display) with numeric data; and
 - (D) apply electronic spreadsheet software both through use of prepared templates and with student designed problem solutions.
- (5) Concepts and skills related to emerging microcomputer-based information processing tools. The student shall be provided opportunities to:
- (A) understand the concept of exchanging information via telecommunication software, at least including electronic mail, remote bulletin board access, and access of on-line information services;
 - (B) understand and use features of integrated software packages to share data among applications;
 - (C) understand concepts and identify characteristics and uses associated with tools for desktop publishing and generation of presentation graphics;
 - (D) understand concepts related to transporting of textual and nontextual data both locally and remotely, at least including transporting of text and facsimile images electronically, and physical transfer of ultra-high density storage media; and
 - (E) understand concepts related to networked and multi-user configurations.
- (6) Concepts associated with the social implications of computers. The student shall be provided opportunities to:
- (A) examine issues concerning responsible use of computer systems;
 - (B) understand the social ramifications of computer applications related to privacy, values, and reliability of systems; and
 - (C) understand the impact of computing on leisure and household management.

OFFICE EDUCATION ESSENTIAL ELEMENTS

BUSINESS FINANCIAL APPLICATIONS

75.87

- (k) Business financial applications (1/2 or one unit) shall include the following essential elements:
- (1) Concepts and skills related to banking operations. The student shall be provided opportunities to:
 - (A) identify and understand checking accounts;
 - (B) understand fundamentals of teller operations; and
 - (D) identify and understand bookkeeping systems.
 - (2) Concepts and skills related to credit administration. The student shall be provided opportunities to:
 - (A) understand methods of credit investigation; and
 - (B) understand concepts related to the use of credit analysis.
 - (3) Concepts and skills related to loans. The student shall be provided opportunities to:
 - (A) identify types of loans and purposes; and
 - (B) demonstrate and understand calculation of interest and payoff.
 - (4) Concepts and skills related to legal aspects of banking. The student shall be provided opportunities to:
 - (A) understand customer and consumer services; and
 - (B) understand regulations of financial intermediaries.
 - (5) Concepts and skills related to other financial institutions. The student shall be provided opportunities to:
 - (A) understand and explore savings and loan operations; and
 - (B) understand and explore credit union operations.

APPENDIX D

SUGGESTED MINIMUM EQUIPMENT, FURNITURE, AND SUPPLIES LIST

(for a Quality Office Education program)

Equipment and furniture:

- A computer or a terminal for each student
 - 640 K minimum storage
 - two disk drives
 - at least one machine should be equipped with a disk drive to use the new 3 1/2 inch diskettes
 - hard disk 20 meg.
 - standard keyboard with keypad
 - high resolution graphics capability
 - several expansion slots
- Monitors
 - color if at all possible
 - high resolution at least EGA
 - swivel/tilt monitor bases
- Printers (A combination of the following printers may be needed in some programs)
 - A dot matrix printer for every two computers (programming classes)
 - graphics capabilities
 - 24 pin
 - near letter quality/high speed modes
 - Letter quality printers for every two computers (microcomputers/application classes)
 - Laser printer (preferably postscript)
- Other computer peripherals and equipment
 - Scanner (If you will be doing a lot of graphics work)
 - Automatic switch boxes for switching access to each computer/terminal attached
 - Mouse for each computer or terminal
 - At least two modems and access to dedicated phone line
 - Extra cables for attaching various peripherals
- Copy machine
- New overhead projector with low heat/good cooling system
- LCD computer panel for data projection
- Pull-down movie screen
- File cabinets and storage cupboards
- Adjustable copy stands
- Adjustable student work stations at appropriate height
- Adjustable chairs, preferably rolling

Supplies

Covers and keyboard covers

Sufficient number of diskettes for backups of each software programs for each computer

Computer paper, both laser and regular cut

Ribbons--standard black and colors

Locking diskette cases

Colored diskettes--each class uses a different color

Computer maintenance kit--including screw drivers of various sizes, q-tips, alcohol, screen wipes, mini vacuum, air vacuum

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APPENDIX E

ACKNOWLEDGEMENT

The module 7 Overview of the Vocational Special Needs Teachers Training Curriculum has been reprinted with permission as this appendix. Teachers are encouraged to refer to the original publication to learn more about working with special needs populations. The character font size and line spacing have been changed in this appendix to save space.

The project was developed in 1987 by Craig R. Colby, Ed.D. of Texas A&M University. Linda H. Parrish, Ph.D., Texas A&M University, and Jerry L. Wircenski, Ph.D., North Texas State University, were the project directors.

The vocational special needs teacher training curriculum was developed pursuant to a contract with the Texas Education Agency's Vocational Education Special Projects. Contractors or grantees undertaking such projects under Agency sponsorship are encouraged to freely express their professional judgement in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Texas Education Agency position or policy.

This information is presented as an appendix to help Office Education teachers with planning the modification of instruction for special populations. Many of the concepts and ideas presented are sound practices to be used with normal populations.

The entire 10 module training curriculum is available through the Extension, Instruction and Materials Center, University of Texas at Austin, P.O. Box 7218, Austin, Texas 78713-7218.

Some examples have been modified to meet the needs of Office Education programs.

CURRICULUM MODIFICATION

The term "vocational curriculum" can be defined as the organized content of a particular discipline which a student must master to attain an occupational goal. It involves the sum total of all experiences and learning activities encountered in the classroom. A curriculum is concerned with results. It encompasses "what is to be taught" and "what is to be learned" (Stern-Otazo, 1980; Goh & Sitlington, 1983).

As discussed in previous modules, each student has a mental capacity, physical skills, and various needs which vary from one individual to the other. In addition, students exhibit different learning styles. All good teachers recognize this and will work toward developing a classroom environment which is characterized by a deep respect for the learner, acceptance of student, fulfillment of individual needs, and individual development. This is what is meant by the teacher who has become "learner-centered" and not "content-centered" (Pine & Boy, 1977). Jones (1977) eloquently describes recognizing individual worth and individual development as being the basis for curriculum development as follows:

Individual development as a basis for curriculum perspective would lead us to teach discovery of principles and sacredness of the individual personality. It would teach the learners to view themselves as self-actualizing individuals in a setting designed to support and encourage personal development to the ultimate of one's potential. Attempts to improve the local community would center around providing a richer and fuller life for personal growth and development. Good people make good communities, good states, good nations, and good world. By emphasizing development of individuals, such a curriculum would hope to plant the seed for a better world in the future.

Therefore, all learners should be perceived as a very "special" individuals who one day will take their place in society. It is the responsibility of educators to assist all learners (in spite of their shortcomings) to become productive members of society. This can be accomplished by helping each student establish attainable career goals and then providing meaningful experiences through which the student can achieve these goals. Every student should be treated with dignity, as an individual who has unique strengths and interests in life. It is not necessary or even realistic to expect every student to do and know all the same things. As stated by Jones (1977), "Learners should become worthwhile persons in their own right,...it is not necessary that they all become miniature images of the same pattern."

Purpose of Curriculum Modification

When working with students with special needs, a learner's curriculum may need to be modified or adjusted to take into account major differences which could be found among these individuals. The term "curriculum modification" can be defined as tailoring an existing curriculum to the unique needs of students as they pursue an occupational goal (Sarkees & Scott, 1985; Goh & Sitlington, 1983). However, it should be strongly emphasized that modifying a curriculum does not mean that an educator should lower or alter the standards of his or her program. What it does mean is that the Admission Review and Dismissal (ARD) Committee (for handicapped students) or coordinated planning team (for disadvantaged and LEP students) determines which essential elements in the regular school curriculum would be appropriate for a student's needs. The State Board Of Education Rules For Curriculum offers the following key points (Texas Education Agency, 1985):

1. For students with special needs, school districts shall provide modifications in methodologies, pacing, and materials to ensure that instruction is delivered, as appropriate, in the essential elements.
2. Students with special needs shall be instructed in those same essential elements in a manner appropriate to their needs.
3. School districts shall implement the provisions (under Chapter 75) in a manner which will enable all students to participate actively in a well-balanced curriculum and master, to the best of their abilities, the knowledge, skills, and competencies established through the essential elements.
4. Specialized personnel and regular program personnel shall be jointly responsible for the cooperative delivery of effective instruction in the essential elements, as appropriate.

It is important to re-emphasize that special needs students, as all students, have capabilities which widely vary. The challenge parents, educators, and vocational counselors face is to help each learner reach occupational goals which are within the student's potential.

The Curriculum Modification Process

In developing a meaningful and challenging vocational curriculum for a special needs learner, the ARD Committee or coordinated planning team should carefully review the student's vocational assessment information which consists of: (a) the student's capabilities, (b) parent and student interviews (including the career expectations of the learner), (c) the student's vocational interests and abilities, and (d) the teacher's informal behavioral assessments of the student.

After reviewing this information, the planning team can then work toward developing realistic and appropriate vocational goals for the student. Important items to consider when developing vocational goals include: (a) community employment needs, (b) vocational readiness skills, (c) multiple exit points (jobs that a learner can prepare for in the vocational program), and (d) entry-level competencies expected by employers for each of the exit points. In this way, the learner would be aware of realistic employment opportunities, specific skills needed for entry into a vocational program, and specific objectives which must be fulfilled in reaching an employment goal.

A number of special education curriculum models have been designed which take into account both the needs of a vocational program and the needs of the learner. The basic components which many of the designs have in common are as follows:

1. The importance of working with existing vocational curricula.
2. The importance of building upon the student's interests and competencies.
3. The identification of long range vocational goals and short range objectives--which are stated in measurable terms.

For the purpose of this overview, the competency-based curriculum modification model has been selected for discussion.

The Competency-Based Curriculum

Over the years, the concept of competency-based curriculum has increased in popularity largely due to the emphasis on accountability in education (Choate, et al., 1987). In addition, since the passage of P.L. 94-142, vocational educators have had to adjust their curricula to take into account the capabilities of special needs learners.

The underlying principle behind the competency-based curriculum is to assist the student in becoming a more effective person. This entails helping the student develop skills or competencies which will promote employment opportunities and a higher self-esteem within the student (Brolin, 1976; Lippmann & Porter, 1976). The ability to succeed is what makes competency-based learning so valuable for students with special needs (Kok, 1978). With competency-based learning a student does not have to wait until the end of the program to experience success. The sequential steps called for throughout the program afford the possibility of success on a day-to-day basis (Lippmann & Porter, 1976).

The concept of competency-based learning is relatively simple. Based upon the learner's assessment information, the educator establishes specific goals (competencies) which will help the student "function adequately as a consumer, a producer, a learner, and a citizen" (Parnell, 1973). For example, in an auto mechanics class, the student's occupational program goals or competencies may include one or more of the following: (a) performing a simple lubrication, (b) repairing a tire, (c) changing the battery, (d) completing an engine tune-up, (e) completing a valve job, (f) fixing the carburetor, or (g) overhauling the engine. Next, the educator develops objectives and an individualized instructional plan for the student to follow. This individualized instructional plan includes: (a) an objective, (b) an introduction, (c) a learning activity, (d) a test/checklist, and (e) answers/feedbacks.

Therefore, in competency-based learning it is not necessary or even realistic for the instructor to expose every learner to all the aspects of a vocational program. Competency-based learning focuses on the quality of learning rather than the quantity of learning such that the student who has limited skills could still find employment (Kok, 1978).

Gills's Four-Step Model

An excellent competency-based paradigm or model which can be utilized by vocational educators to maximize a learner's vocational potential was developed by Douglas H. Gill (Sarkees & Scott, 1982). The design of Gill's model involves the use of four sequential steps and utilizes the regular vocational curriculum as a basis for the modification process.

Step one. The first step in Gill's model requires the educator to gain a clear picture of the existing curriculum any student would follow in a particular vocational program. Gill calls this step "Establishing the Curriculum Framework." The purpose of this step is to organize the existing curriculum in such a way that it can be modified. This step involves: (a) identifying the overall long range goals of the vocational program, (b) identifying and listing the short-term objectives that sequentially comprise each long-range goal, and (c) identifying the instructional units which comprise a sequence for attaining each short-term objective. An example of a curriculum framework which outlines an overall long range goal, short-term objective, and instructional units follows:

1. **Long range goal:** Given appropriate tools, equipment and materials, the student will be able to demonstrate instructor specified job entry level skills in office occupations at a comparable rate of time and accuracy to that found on the job.
2. **Short term objective:** The student will be able to demonstrate the basic skills of data entry.
3. **Instructional units:** Word Processing. Using Data Base. Using Spreadsheets.

Once the long range goals, short term objectives, and instructional units have been outlined for a particular vocational program, the educator can begin the work of modification for a special needs learner.

Step two. Step two of Gill's four-step model, "Developing an Instructional Task Analysis," builds upon step one. The instructional task analysis lists the tasks that, when sequenced, make up the instructional unit. In this step the educator identifies the required tasks the student must perform, emphasizing what the student must do rather than what the student must read or write. An example of instructional tasks for one of the instructional units above follows:

1. **Instructional unit:** Word Processing
2. **Instructional tasks:**
 - Operates standard keyboards
 - Gains access to system
 - Terminates operations
 - Operates keyboard functions keys
 - Operates visual display stations
 - Operates optical character recognition equipment (OCR)
 - Develops user-defined program sequences
 - Implements program sequence
 - Uses new hardware and software features
 - Operates storage function controls
 - Uses floppy disks to store, retrieve and/or duplicate information
 - Uses fixed disk to store, retrieve and/or duplicate information
 - Uses magnetic tapes to store, retrieve and/or duplicate information
 - Initializes disks
 - Deletes information from storage
 - Handles and stores media
 - Operates output device function controls
 - Operates paper handling devices
 - Uses impact printers
 - Uses laser printers
 - Uses telecommunication features
 - Performs operator maintenance
 - Determines sources of malfunctions
 - Corrects or reports malfunctions

Therefore, establishing the curriculum framework and required instructional tasks (task analysis) organizes the instructional process and prepares for the next step in the process.

Step three. The third step in Gill's four-step model represents the implementation stage. This step, "Developing the Curriculum Supplement," involves developing usable supplements for the existing curriculum. The curriculum supplement is designed to be used jointly by the instructor and the resource support person. The curriculum supplement is composed of two major parts: (a) the Learning Plan and (b) the Supplemental Learning Plan.

The Learning Plan is used primarily by the instructor and consists of the following four basic parts:

1. Instructional unit
2. Instructional task
3. Performance-based task activities
4. Performance-based task check

The instructional unit and instructional task are components of the curriculum framework. The performance-based task activities describe for the instructor those task elements the student will do. The performance-based task check is a measurement of the student's ability to master the task at hand.

The Supplemental Learning Plan was developed for use primarily by special needs support personnel and consists of the following six basic parts:

1. Instructional unit
2. Instructional task
3. Task terminology
4. Essential math operations
5. Coordinated movements
6. Related concepts

The purpose of the Supplemental Learning Plan is to identify basic knowledge (task terminology, essential math operations, important concepts) and prerequisite skills (coordinated movements, related concepts) the learner must possess in order to complete an instructional task. The Supplemental Learning Plan can be very useful in helping the resource teacher and instructor identify those areas where instruction support may be needed. It is, therefore, very important that the Learning Plan and Supplemental Learning Plan be developed by the instructor, special education teacher, or support/resource teacher for each instructional task. In this way, if a learner has difficulty mastering a specific task, individualized activities can be developed by selected individuals to help the student resolve the problem.

Step four. The fourth and final step of Gill's model is the development of an individualized student module. The student's module is created from the Learning Plan and Supplemental Learning Plan and is

the culmination of the curriculum modification process. The student's module consists of the following four components (Goh & Sitlington, 1983):

1. **Word section:** Includes terms identified on the supplemental learning plan, along with definitions of each term.
2. **Job tasks:** Definition of each step in the job. This appears in the student module under the heading "What You Do."
3. **Illustrations of job tasks:** The illustrations help clarify the job steps and should be clear and precise, without being complex.
4. **Evaluation procedures:** Both enroute (formative) checkups and a final (summative) performance check are included to assess the learner's progress through the module.

The student's module is tailored to help meet the specific needs of a learner and serves as a guide to assist the student in achieving instructional tasks. Various ways in which a student's module can be individualized to take into account the various learner differences found in the training setting are as follows (Goh & Sitlington, 1983):

1. The amount of detail and illustrations can be varied to take into account learner differences in intellectual abilities and educational backgrounds.
2. The mode of presentation can be altered to meet the needs of learners with differences in learning styles (e.g. audio-cassettes can be added for auditory learners).
3. The amount of feedback from the module and instructor can be increased or decreased to match differences in motivation, perseverance, and tolerance levels.

In summary, Gill's four-step model is a competency-based process flowing directly from the regular vocational curriculum. The steps range from establishing a curriculum framework to developing an individualized student module. Gill's model is not designed to replace or lower the standards of the regular vocational curriculum. It is a systematic process by which a special needs student can achieve solid vocational goals through the cooperative support of vocational instructors, special educators, and support personnel.

Responsibilities of the Vocational Educator

The primary responsibility of the vocational educator in the curriculum modification process is to help the special needs student establish and reach realistic occupational goals. In an effort to accomplish this, the vocational educator must identify the following (Sarkees & Scott, 1985):

1. Pertinent information about what will be taught in a vocational program.
2. Necessary requirements for program completion.
3. Multiple exit points (jobs that the learner can prepare for in a vocational program).

4. Entry level competencies expected by employers for each of the exit points.

It is also the responsibility of every vocational educator to establish an effective and wholesome learning environment for their students. Providing this environment may involve modifying the vocational facility, equipment, tools and/or instruction. This information will be provided in the following section.

MODIFICATION OF THE LEARNING ENVIRONMENT

The term "learning environment" refers to both the physical and instructional setting of the vocational classroom/laboratory (Bell, 1984). It is the responsibility of each vocational educator to work at developing a learning environment which will contribute to the overall well-being and success of every student. The key factors found in a wholesome learning environment are those which promote:

1. **Safety, organization, and physical comfort.** In the vocational laboratory, it is absolutely crucial that each student abide by safety rules set by the instructor. In addition, the laboratory should be kept well organized and clean. A laboratory which is safe, well organized, and physically comfortable helps promote high morale and good work habits.
2. **Respect and acceptance.** Within an effective learning environment, students will show respect not only for the instructor but for each other as well. The instructor should be the student's best role model. The care and acceptance given by the instructor to each student (disabled or non-disabled) will go a long way in promoting peer acceptance, a positive attitude, and healthy self-esteem.
3. **Discipline.** A wholesome learning environment is one which promotes discipline and a positive self-concept within each student. Inappropriate behavior has the potential to seriously affect classroom safety, morale, and the overall learning process. Ways in which the instructor can help the student modify inappropriate behavior include: (a) utilizing the time-out technique, (b) developing student-teacher contracts, (c) ignoring negative behavior--whenever possible, and (d) rewarding appropriate behavior with approval and praise.
4. **Flexibility.** An effective learning environment is flexible and can adapt to a special student's unique needs (i.e., slower rate of learning, inability to access regular tools/equipment, or remedial needs in reading or math for instance). A flexible environment fosters individualized programs through which a special learner can develop marketable skills for employment.

Modifying Facilities, Equipment, and Tools

In the past, many special needs learners have been denied their basic right to a public education because of architectural barriers, nonadaptive facilities, equipment, and tools (Phelps & Lutz, 1977). However, federal legislation has done a great deal to provide equal access to educational programs for every learner. For example, according to Section 503 of the Rehabilitation Act of 1973, each federally funded program or activity in which a handicapped individual can enroll and profit must be made accessible to the student (Sarkees & Scott, 1985). In addition, the Carl Perkins Act of 1984 has emphasized the importance of providing supplemental services for special needs learners, which include the adaptation of facilities, equipment, curriculum, and instruction (Cobb & Kingbury, 1985).

Modifying facilities. A barrier-free facility planned for safety, efficiency, and convenience is of vital importance to individuals with special needs--especially those who are in wheelchairs, on crutches, or have artificial limbs. According to Sarkees & Scott (1985), three major areas in which architectural barriers may be present at most vocational education facilities are:

1. **Getting to and entering the building** -- getting to the ground from public or private transportation; parking; negotiating parking lot pavement, curbs, walkways, ramps, and stairways; and entering exterior doors.
2. **Moving about inside a building** -- moving through corridors and hallways; moving from floor to floor; identifying and entering classrooms, laboratories, and auxiliary areas; moving through aisles and traffic lanes inside classrooms and laboratories.
3. **Using school fixtures, appliances, and study/work station area equipment** -- using restrooms, drinking fountains, vending machines, tools, machines, and work station apparatus.

In an effort to eliminate these barriers, vocational educators, planners, and administrators should contact the State Architectural Barriers Board or State Department of Education regarding the guidelines and standards that have been developed for compliance with federal mandates. The federal government has adopted the American National Standards Institute (ANSI) accessibility standards as its mandatory guidelines for removal of architectural barriers (Sarkees & Scott, 1985).

Modifying equipment and tools. Based upon the needs of each special learner, it may become necessary to modify existing equipment and tools to accommodate the special needs student. The degree of modification will depend upon the type and extent of each student's impairment. It should be remembered, however, that equipment should be modified only to the extent necessary to assist the student. Whenever possible, as the student generates competence in a learning task, the modified equipment should be replaced with regular equipment (Phelps & Lutz, 1977). The following are some general suggestions in which equipment and tools can be modified for specific classifications of special needs students (Phelps & Lutz, 1977; Sarkees & Scott, 1985; Stern & Gathercoal, 1986):

Important Note:	It is very possible that a number of these suggestions could apply to <u>more</u> than one category. Furthermore, some of these modifications may be applicable to disadvantaged and LEP students. This, of course, would depend upon the needs of the particular student.
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Modifications for Orthopedically-Impaired Students

1. Work benches can be cut out so that wheelchair bound students can pull up close to the work surface.
2. Modify the height of workbenches, storage cabinets, table tops, etc. to make them accessible to wheelchair bound students.
3. A lap board can be fitted on the arms of the wheel chair to provide a work area.

4. Rearrange storage areas for tools and supplies to make them accessible and as near to the work station as possible.
5. Position bench-mounted power tools on the ends of benches.
6. Semistationary equipment should be put on variable height bases.
7. Modify machine controls so that they can be operated with prostheses such as an arm hook.
8. Replace cabinet knobs with levers or handles.
9. Convert knob-type ON-OFF switches to toggle switches, levers, or slide-adjustment mechanisms.
10. Provide an aid that increases mechanical advantage in manipulating controls.
11. Convert machines and equipment that have hand controls to the foot pedal type for students who have upper extremity disabilities.
12. Select machines that do not require two-handed operation, such as a radial arm saw instead of a table saw.
13. Place small parts of instruments on a foam pad to aid students in picking them up.
14. Select tools that require only one hand to operate, such as split screwdrivers, which hold screws and bolts for starting.
15. Provide holding devices such as vacuum vises, stationary vises, clamps, jibs, and fixtures that permit one-handed operation.
16. Provide tools that supply more mechanical advantage to loosen or tighten screws or bolts, such as a lever-type socket set or an offset screwdriver.
17. For students who have weak hands, increase the size of tool handles by replacing them with larger diameter handles or by enlarging them with tubing or tape wrappings.
18. Provide templates to aid drafting students who have trouble manipulating standard drafting instruments.

Modifications for Hearing-Impaired Students

1. Install a red light next to the on-off switch so that the student can tell when the machine is in operation.
2. Install amplification devices on auditory warning signals so that they can be heard by those with partial hearing.
3. Use visual timers in place of those that emit sounds.

Modifications for Visually-Impaired Students

1. Purchase commercially available measuring tools with raised or engraved markings that can be read by touch.
2. Purchase measuring devices that provide auditory signals.
3. Brailled tape or raised marks can be used on control dials and switches.
4. Enlarge markings on tools, tool holders, or machine controls.
5. Provide jigs, guides, and templates to aid students in positioning and guiding tools.
6. Identify controls by changing their size, shape, or texture.

Modifications for Mentally-Impaired Students.

1. Color code important parts of machines or equipment.
2. Devise jigs, fixtures, templates, and guides to simplify work task operations.

Modifications for Limited English Proficient Students

1. Utilize name placards (Spanish and English) for machines, tools, and equipment.
2. Color code or use symbols for dangerous machines. For example, one red dot could indicate a dangerous machine and two red dots could indicate a very dangerous machine.

A wide variety of specially designed aids, tools, machines, and equipment are commercially available to assist the special needs learner. Occasionally, this material can be paid for through vocational rehabilitation centers or the school's special education program. Information pertaining to manufactured devices can be found in school supply catalogs or in catalogs published by special institutes. A very comprehensive resource has been developed by the Wisconsin Studies Center, University of Wisconsin-Madison, entitled Tools, Equipment and Machinery Adapted for the Vocational Education and Employment of Handicapped People. In addition, information is available through the school's special education personnel and vocational rehabilitation counselors (Sarkees & Scott, 1985).

In conclusion, two educational topics have been presented which are **fundamental components** to the successful instruction of learners with special needs: (a) developing or tailoring an appropriate curriculum and (b) establishing a favorable learning environment. Within the final section of this Overview, basic principles will be presented which will address the actual instruction of special learners.

MODIFICATION OF INSTRUCTION

The primary purpose of this section is to provide the vocational educator with teaching strategies and techniques that will be useful when instructing students with special needs. It is important to remember that the methods and approaches used by educators when instructing non-special needs students may not be very effective with students with special needs (Gleiss-Monar & Sitlington, 1983). Therefore, individualizing instruction becomes vitally important in the successful instruction of special learners.

Within this section, the following topics will be discussed: (a) learning styles, (b) teaching strategies, (c) remediation techniques, and (d) Brown's 3-Cs Instructional Mode.

Learning Styles

Each special learner has unique needs and these needs affect how the student can best learn. For example, if a student is blind or has difficulty with "visual" learning, the instructor should stress the learner's sense of sight. Therefore, the manner in which a student with special needs learns ceases to be a preference, but becomes instead a necessity (Kok, Jernigan, & Hull, 1978). Further, one of the main philosophies behind individual learning styles is that learning should be a pleasant and successful experience. Educators, therefore, should adjust their style of teaching to allow students the benefit of learning in their preferred manner (Kok, Jernigan, & Hull, 1978).

Identifying a student's learning style.

The following are methods in which an educator can identify a student's learning style:

1. **Informal observation.** One of the simplest and possibly best ways to identify a student's learning style is through informal observation. By observing the student as he or she negotiates classroom/laboratory learning activities, the educator can collect valuable information with regard to the student's learning style. For example, the educator may observe that a disadvantaged student answers questions in class and does well with hands-on activities but repeatedly fails written exams. If the primary intent of the instruction is to reach vocational skills rather than reading and writing skills, the instructor could modify their style of teaching by allowing the student to take oral and/or hands-on exams (Kok, Jernigan, & Hull, 1978; Sarkees & Scott, 1985).
2. **Teacher consultation.** Consulting other teachers (i.e., special education teachers, resource room teachers, support personnel, paraprofessionals, and other vocational education teachers) can be an excellent source for information regarding a student's learning style (Sarkees & Scott, 1985).
3. **Student/parent interviews.** Interviewing the student and student's parents/guardians can result in valuable insights as to the student's best learning modes (Sarkees & Scott, 1985).
4. **Standardized inventories.** Standardized inventories provide an alternative for students who are shy or uncomfortable during a personal interview. Information received from interest, personality, and learning style inventories can provide valuable information with regard to the student's learning style (Kok, Jernigan, & Hull, 1978; Sarkees & Scott, 1985).

Teaching Strategies

Once the student's vocational goals, learning capability, and preferred learning style have been identified, the educator can begin to experiment with a variety of teaching techniques and instructional materials. When determining the teaching technique and instructional material best suited to meet a student's unique needs, it is important for the educator to be patient, open-minded, and flexible. Not every instructional technique and/or material can be used successfully with each learner (Sarkees & Scott, 1985). In addition, the educator should not hesitate to enlist the support of other instructors, school counselors, student aides, paraprofessionals, volunteers from the community, itinerant teachers, and/or interpreters. This pooling of efforts can result in increased student learning because of the variety of approaches and personal attention which can be brought to the classroom or laboratory (Harrington & Fardig, 1982).

The following are general guidelines and instructional techniques which an educator can use to help meet a special needs learner's unique needs and learning style:

1. **Orientation.** Students with special needs may need additional orientation with regard to: (a) the relevancy of their individualized goals, (b) class procedures, (c) safety, etc.
2. **Flexible pacing.** Students with special needs can exhibit different rates of learning. The educator should provide flexibility in pacing of instruction and assignments to meet the various needs of learners. In general, students with special needs should be individually paced to maintain their progress and interest, yet avoid the frustrations and failure undue pressure may cause (Harrington & Fardig, 1982; Sarkees & Scott, 1985).
3. **Demonstration.** Utilization of the demonstration method can be very effective in introducing a new skill to a learner with special needs.
4. **Breaking material into small distinct steps.** As a general rule, it is important for the educator to break a learning concept into small distinct steps. In this way, the educator can best identify where the student is experiencing difficulty.
5. **Positive environment and feedback.** In general, students with special needs lack confidence and a positive self-concept. This is primarily due to their not having had much success in life. In addition, the few successes special learners do have usually result in little, if any, positive reinforcement (i.e., praise, reward, and/or encouragement). Therefore, it is incumbent upon educators to create a positive, nonthreatening learning-environment for their students and to make generous use of positive feedback when the student experiences success. Constructive criticism should not be avoided; however, it should be given in a positive manner (i.e., students should understand that their behavior or product is what's being criticized and not their worth as a human being). Finally, all students must learn that mistakes and constructive criticism are a normal and expected part of life (Harrington & Fardig, 1982).
6. **Use of peer tutors, college students, and volunteers.** Use of peer tutors, college students, and volunteers can greatly assist a vocational educator's work with special learners by: (a) helping with individualized instruction, (b) providing positive role models, (c) increasing student participation, (d) increasing the special learner's success experiences, (e) increasing the student's confidence

and self-esteem, and (f) improving the special learner's social and academic skills (Asselin & Anderson, 1986). In addition, peer tutors, college students, and volunteers can receive teaching experience and the satisfaction of helping individuals with special needs progress.

7. **Flexible grouping.** The educator can integrate special needs learners into groups of various sizes (according to the student's goals, interests, or ability level) and utilize peer tutors, college students, and volunteers for assistance. According to Sarkees & Scott, grouping students has the following advantages: (a) it allows the teacher more time to work among the students, (b) it allows the teacher to individualize instruction, tasks, and assignments to meet the needs of students in a specific group, (c) it provides special needs learners with an opportunity to work with peers and establish positive interpersonal and working relationships with them, (d) it serves as a motivating factor for special needs learners because the individualized nature of the group work does not become threatening or frustrating but allows students an opportunity to work at their own pace through their strongest learning style, (e) it allows teachers to arrange for instruction for the entire class, small group discussions, project groups, and small remedial sessions so that instruction will be diversified and more meaningful for all students; and (f) it allows the teacher to modify the task or assignment for a small group of students with specific needs, as in the case of learners who have a physical disability (Sarkees & Scott, 1985).
8. **Providing field trips and job site visits.** Scheduled field trips and job site visits can give all learners a realistic first-hand look into the real world of work. By "shadowing" workers in a particular occupational area, students can gain helpful insights into their own career decision. In addition, a field trip or job site visit can be very motivational in that the student can readily observe how his/her vocational training will be used in the world of work (Sarkees & Scott, 1985).
9. **Use of media.** Utilizing media can embellish instruction by: (a) assisting the teacher in presenting the proficiency or skill requirements for a specific job, (b) reinforcing concepts presented in a classroom, laboratory, or demonstration activity, (c) providing a vehicle for special needs learners to show what they have learned, (d) providing a valuable source of remedial assistance, (e) providing simulated learning experiences, (f) allowing special needs students to learn through their strongest style, and (g) adding variety to the instructional program. Examples of media include: computer assisted instruction (CAI), 16 mm films, film strips, flip charts, overhead transparencies, tape recorders, records, posters, magazines, and diagrams (Sarkees & Scott, 1985).
10. **Use of student-teacher contracts.** Student-teacher contracts can be excellent tools in helping learners with special needs achieve their vocational goals. The following guidelines should be used in developing and implementing a student-teacher contract: (a) decide on the task or project, (b) specifically state the requirements, (c) determine the minimum acceptable accuracy, (d) set a time limit--initially, short assignments and short time periods are usually best, (e) identify consequences, (f) discuss contract with student and support personnel, (g) have all parties sign the contract, (h) positive reinforcement should be given if the terms of the contract are satisfactorily met, (i) uncompleted contracts should be analyzed by the teacher and student to determine the causes, and (j) develop new contracts cooperatively (Sarkees & Scott, 1985).

The following is a list of specific teaching strategies which educators can utilize when addressing the unique needs of handicapped students (Sarkees & Scott, 1985; Stern & Gathercoal, 1986; Tindall, 1980):

Important Note: It is very important to note that many of these teaching strategies could be used for all students. Appearing later in this Overview is a listing of instruction strategies which could be generic to all special needs students.

Instructing Students Who Are Mentally-Impaired

Involve as many different senses as possible in the learning process.

Use concrete specific terms rather than abstract terms. If necessary, have the student repeat the necessary information to you.

When giving written directions use lists instead of paragraphs. With regard to the student who can barely read, contact the remedial reading staff and arrange reading instruction. This instruction should focus on required reading for your course and that which is vital for employment.

Teach by demonstration (whenever possible). Don't hesitate to use hand-over-hand assistance in demonstrating how to use a tool or machine.

Allow time to practice machine or tool processes.

Break down complex operations into smaller tasks.

With regard to feedback, let the learner know what is wanted, and whether or not the student is achieving it. Give lots of positive reinforcement and encouragement. Nonverbal feedback is also helpful (i.e. touching the student or task, pointing, blocking or stopping an error as it is developing, and guiding the learner's movements). In addition, provide specific feedback with regard to the student's work. For example, the educator should say, "This piece was cut exactly to the right size," or "You put these two parts together correctly," or use Mark Gold's expression "Try another way" (Gold, 1975).

Build the student's confidence by: (a) utilizing activities that will assure success, (b) assigning special tasks which will communicate with the educator's confidence in the student, (c) giving students an opportunity to correct their work and hand in a good project or assignment, and (d) displaying the student's good work.

In helping students with their ability to make correct discriminations, utilize Gold's "match to sample" technique in which the student is provided an example and a number of choices. The student will choose the correct alternative based upon the characteristics of the sample (Gold & Scott, 1971).

With regard to helping the student make correct discriminations when there are minimal differences between the stimuli, it may be necessary to: (a) present the choices in an easy form at first, (b) exaggerate attributes, (c) make the choices gradually harder, or (d) add and fade out color cue, add and then gradually remove large cue differences, or combine these two approaches.

Retention/memory can be improved by: (a) being systematic and presenting one new piece of learning at a time, (b) relating new material to familiar material, and keeping it practical and concrete, and (c) utilizing training techniques such as the total task method, chaining, modeling/demonstrating, and the structured overview (see Tindalls' Puzzled About Educating Special Needs Students).

"Generalizing", or having the student apply what has been learned to the contexts, can be improved by: (a) using examples from different relevant contexts and (b) practicing in settings similar to or exactly like those that will be encountered on the job.

Instructing Students Who Are Hearing-Impaired

In private, discuss with the student his/her ability to communicate with you (lip/speech reading, use of hearing aid, writing, signing, and total communication). An open discussion with the student which demonstrates your concern as an educator is an excellent beginning in building rapport.

Body language communicates messages too. Remember not to give mixed messages with your body language. Also, be alert to the body message the student is giving you (i.e., is he/she communicating tension, nervousness, avoidance, or confusion?)

If you will be working with an interpreter, do not instruct the deaf student as if he/she were a third party. Speak directly to the student. Also, remember that the interpreter is ethically bound to interpret everything you say. Therefore, sensitive or other issues concerning the student is best addressed in a meeting before or after class. If you are using media where the room must be darkened, focus a small lamp on the interpreter.

Maintain good eye contact with the student while speaking.

Speak slowly and clearly, pronouncing each word, but without exaggerating or over pronouncing.

Do not stand in front of a window while speaking. The light should be shining on your face and not the student's.

Try to rephrase a thought rather than saying the same words over again.

Encourage the student to read ahead on class material.

Try to keep the noise level down as much as possible in the class/laboratory.

Utilize handouts, the chalkboard, and other media.

Install a light to indicate when dangerous machinery is on.

Instructing Students Who Are Speech-Impaired

Always maintain eye contact and nod your head while the student is talking. This will help the student build confidence.

Work cooperatively with speech therapist and/or communication specialist to determine which technique will help most in assisting these students to communicate more effectively.

Encourage peer tutoring and small group activities to help the speech-impaired student develop interpersonal relationships with the other students.

Always allow sufficient time for the student to complete his/her sentence.

Try not to act uncomfortable when these individuals are communicating with you (i.e., discontinuing eye contact, shifting your position, clearing your throat). Your discomfort can be very discouraging to the student.

Do not require these individuals to present oral reports until they feel comfortable in the classroom environment.

Model correct sentence structure for the speech-impaired student so he/she can follow your example.

Develop a list of technical terms used in your class and share these terms with the speech specialist to help the student become more confident in pronouncing terms used in class.

Instructing Students Who are Visually-Impaired

Orient the student to the classroom or laboratory before the course begins. Consistency and orderliness in the physical environment is very important to the visually-impaired student.

Arrange seating so the blind student will be able to hear the instruction and to allow for the best distance and lighting conditions for the partially sighted student.

Provide as many opportunities as possible for the visually impaired student to observe closely or to touch the materials.

Give materials and handouts to the student ahead of time. Also, a student peer can assist the visually-impaired student by making a carbon copy or a photocopy of their notes. Also, when possible, the educator can make a copy of their teaching notes. In this way, the visually-impaired student can review the materials with a tutor or have them transcribed into braille or taped.

It is important to gain and maintain the student's attention. Approval or disapproval will need to be verbalized.

Remember there is no need to talk louder to a visually-impaired student.

Rehabilitation counselors or special needs teachers can be useful resources in helping the student use commercial or modified learning aids or tools.

Tests may need to be prepared in large print, braille, on cassette tapes, or converted into exercises using the sense of touch. Also, it may be necessary to allow the student extra time to complete the test.

The tape recorder is the most frequently used technique for notetaking and preparing modified learning materials for the visually-impaired student.

The following is a sample of specially designed machines now available for the visually-impaired student: (a) OPTACON (Optical to Tactile Converter) allows students to read printed material, (b) STEREO-TONER is similar to the OPTACON but converts the printed word into a tone pattern, (c) OPTOPHONE and VISOTACTOR convert print into sound, and (d) KURZWEL READING MACHINE which converts standard English text on a computer into easily comprehended speech.

A number of general tools or aids which can assist the student in reading or writing lessons for vocational courses follow: (a) braille, (b) large print, (c) tape recorders, (d) talking books, (e) raised letters, (f) slate and stylus (used to make notes), (g) braille writer (a 6-key manually operated machine), (h) typewriters, (i) braille verifier (types braille and regular copy simultaneously), and (j) signature guides.

Aids for mathematics and computer programming courses follow: (a) abacus design for the blind, (b) raised clock faces, (c) wire geometrical forms, (d) braille rulers, (e) raised-line checkbooks, (f) raised-line boards, (g) braille dominoes, (h) braille flash cards, (i) cubes with raised braille dots used for simple mathematical problems, (j) raised-line paper or graphs, (k) computer terminals that use braille printers, or those that type braille and conventional type simultaneously, and (l) talking calculators.

Aids used frequently in other vocational courses include: (a) braille maps, charts, diagrams, (b) self-threading needles, (c) wooden or cardboard models of specimens that other students see through microscopes, (d) braille micrometers and other shop tools that have special raised markings, (e) braille demo tapes to mark lab equipment and models, (f) light probes with audible sounds that check the operating status of machines, and (g) guides or templates to help students align objects properly.

Instructing Students Who Are Seriously Emotionally Disturbed

Consult with the student's parents, special education teacher, or counselor to determine whether any particular teaching techniques will help or hinder learning.

Try to understand the student. Disturbing behaviors are the outward sign of inner turmoil.

Go easy on bad days and avoid direct confrontations that would aggravate the situation.

Communicate acceptance to the student and a willingness to help him or her succeed in class.

Provide immediate feedback and reinforcement.

Establishing a rapport and trust with the student is important.

In the beginning of the semester, help the student gain confidence by giving him or her lessons in which success can be achieved in a series of small steps.

A measure of privacy when the student attempts a new task can ease his or her embarrassment at any awkwardness or ineptness.

Allow the student to correct mistakes prior to turning in an assignment or project to ease any pressure.

Help the student not to overreact to failure and praise him or her for continuing to try.

Cue appropriate behavior in a quiet, unemotional manner.

In resolving discipline problems: (a) do so in privacy, (b) focus on objective facts in a calm, supportive tone, (c) actively listen to the student, (d) after listening to the student, reflect on what has been said, by telling the student what you've heard, (e) ask the student if he or she has any ideas about solving the problem (encourage the student to be specific), and (f) conclude with a clear understanding of the changes, time-frame, and benefits which are expected.

In handling aggressive behavior: (a) try to remain calm and model the controlled behavior which you desire, (b) intervene by either separating the individuals involved and having them work on another activity or having them take a time-out in separate corners of the room, (c) if necessary, send an uninvolved student to the office to get help, either in talking to the students or in managing the class while the teacher talks to them, and (d) return to normal classroom procedure as quickly as possible.

Access professional colleagues in special education evaluation, counselling, or therapy when the student's behavior appears to be in need of additional attention.

Instructing Students Who Are Orthopedically-Impaired

In general, students with physical handicaps will be intellectually capable and able to participate in vocational programs.

Make the necessary modifications in classrooms, laboratories, equipment, building accessibility, and lavatories.

For notetaking the student can: (a) use a tape recorder, (b) have a classmate slip a carbon copy into his/her notebook to duplicate notes, and/or (c) have the instructor prepare an outline of the lecture.

For exams the instructor can: (a) give oral exams, (b) have the student dictate answers into a tape recorder or to another student, or (c) utilize a typewriter/computer if the student is able to type/keyboard.

Give the student more time to complete homework assignments. Also, giving the student advance notification of assignments is helpful.

In the laboratory, pair the student with one or more capable students in the class.

Enlarge copies of frequently used charts and diagrams posted near the student's desk eliminates the necessity of paging through a book.

Instructing Students Who Are Other Health-Impaired

Allow the students sufficient time for rest.

Seat the student in the most convenient place for easy access to necessary facilities (hall, lavatory, chalkboard, laboratory work stations).

Allow the students to work on program requirements at his or her own pace.

Tape lectures so the student can listen to them at home.

Work cooperatively with the health team in order to learn more about the student's special needs.

Utilize community resources personnel (social workers and itinerant teachers for home-bound students) for delivery of materials, assignments, and handouts.

Instructing Students Who Have Specific Learning Disabilities

Use visuals and demonstrations as often as possible.

Use concrete examples whenever possible.

Provide student with an outline of what will be covered in class.

Make sure all printed materials are clear and readable.

If the student has a visual perception problem, allow him or her to tape-record assignments.

Allow students to take tests orally or in a mode that compliments their performance.

Present new information in small amounts.

Make sure that writing assignments are relevant to the content of the program.

Allow students a longer period of time to complete assignments, if necessary.

List assignments in steps.

Task analysis can be used to lower the frustration level of these learners.

Programmed instruction materials can be very effective with these learners.

The following is a list of specific teaching strategies which can be very useful when working with students who have **limited English proficiency** (Sarkees & Scott, 1985):

Recognize the student's cultural background and allow for the student's individual differences.

Encourage these students to bring dictionaries to class.

Use demonstrations and hands-on experience as much as possible.

Speak slowly and use simple vocabulary and grammar.

Use bright felt tip markers to mark important words, passages, or illustrations.

If possible, use a translator for important concepts.

Work closely with LEP support personnel.

Keep homework assignments short.

Check for comprehension by asking the student what you have said.

Use simple sentences when writing test items so the student can concentrate on answering the question rather than deciphering it.

And finally, with regard to the disadvantaged population, typically these individuals dislike school, lack motivation, and have a low self-concept or esteem. Therefore, an educator's personal commitment and high expectations for the student may be two of the biggest single factors which will make a positive difference in this individual's life. Additionally, an educator's good example (i.e., being patient, understanding, well organized, and a good manager) can be extremely valuable in motivating and positively shaping the student's behavior (Baca, 1981). Vocational education can offer a great deal to the disadvantaged student in terms of teaching academic and social skills relative to the student's potential employment (Baca, 1981). The following are additional techniques or teaching strategies which can be very useful when working with disadvantaged students (Baca, 1981):

The educator should seek to understand the student's educational and social background through: (a) assessment information, (b) interaction with former teachers, (c) discussions with counselors, and (d) visits with parents to ascertain the student's social limitations and home situation.

Basic math, communication, and social skills should be reinforced. Math skills can be reinforced through hands-on learning activities. Communication skills can be improved by tactfully correcting poor grammar, when appropriate, and by providing resources that encourage reading in job related interests. Social skills such as getting along with people, grooming, proper dress, and respect for property and authority should be reinforced on a continual basis.

The importance of finishing school should be continually stressed. Relate acquisition of job skills to earn income.

Reinforce the student's feelings of self-worth by having high expectations for the student and by providing immediate reinforcement for work done well.

Simulate realistic job situations. All classroom and laboratory experiences should relate to employment in the occupation being studied.

Disadvantaged students (as all students) will typically react to the learning environment in a responsible and mature manner when they are treated with respect and as adults by the educator.

Classroom organization and discipline (being firm but not overbearing) are especially important. Generally, disadvantaged students want and need structure and discipline within their lives. Usually, these individuals will be responsive to and respect teachers who are firm, but sensitive.

Help the student develop employability and job coping skills (i.e., skills associated with finding, applying for, and retaining a job).

Help the student establish good work habits by keeping him or her involved with meaningful learning experiences. Each activity should have concrete learning objectives.

Disadvantaged students may need more encouragement to stay on task; however, they still should be required to complete all assignments (just as they will be required to do on the job).

Present instructions and information in clear, logical steps--building from the simple to the complex.

Technical terms should be communicated clearly and concisely and written in language which the students will understand.

Incorporate a variety of instructional methods in the curriculum (i.e., demonstrations, resource personnel, field trips, peer tutors, role playing, audio-visual aids, and on-site work experiences).

Present supplemental materials when appropriate. If such material is relevant to the acquisition of job skills, the student will not be humiliated by simplified material.

Highlight important parts of the student's text with a light marker to prevent the student from feeling overwhelmed with a larger volume of reading material.

Progress charts can be utilized to motivate disadvantaged students to master new skills.

Utilize flash cards (teacher made or commercial) to reinforce new terms and the use of tools and equipment.

When teaching special needs students, it is very important that instructors do not limit their instructional techniques. Therefore, the following abstract of instructional techniques or strategies has been prepared which could be considered generic to all special needs populations.

- Involve as many different senses as possible
- Use concrete terms
- Have students repeat important information
- Use lists rather than paragraphs for written directions
- Teach by demonstration
- Use hand-over-hand assistance when necessary
- Allow practice time
- Break complex operations into smaller tasks
- Provide immediate feedback
- Build confidence

- Help student make correct discriminations
- Help student with their retention/memory
- Help student generalize knowledge
- Build rapport
- Use appropriate body language
- Use appropriate techniques when working with an interpreter

- Maintain good eye contact
- Speak slowly and clearly
- Rephrase thoughts when necessary
- Encourage the student to read ahead
- Keep the noise level down
- Utilize various forms of media
- Use lights to indicate when dangerous machinery is on
- Work cooperatively with therapists
- Encourage peer tutoring
- Try not to act uncomfortable around special needs students
- Help students feel comfortable
- Model correct sentence structure
- Develop a list of technical terms for students and/or therapists

- Orient students before the course begins
- Provide handouts ahead of time
- Maintain student's attention
- Use tape recorders for note taking
- Try to understand the student
- Communicate acceptance
- Develop success experiences for the student

- Use appropriate behavioral management techniques
- Facilitate the students with their notetaking
- Facilitate the students with exams

- Pair students
- Enlarge charts and diagrams
- Use clear readable visuals frequently
- Provide an outline of material which is being taught

- Writing assignments should be relevant
- Use task analysis when necessary
- Allow for individual differences
- Encourage students to bring a dictionary
- Use felt tip marker to highlight important parts
- Do not make homework assignments too lengthy

- Use simple sentences when writing test items
- Reinforce basic education and work skills
- Reinforce the importance of finishing school
- Reinforce the student's feelings of self-worth
- Simulate realistic job situations
- Treat all students with respect and dignity
- Provide structure and organization
- Utilize progress charts
- Utilize flash cards

Remediation in the Basic Education Skills

It is very important to note that some students may need to acquire one or more basic education skills (i.e., mathematics, reading, writing, speaking, listening, interpersonal relations, and/or reasoning skills) to succeed in a vocational program. In addition, many employers will not hire an individual if he or she lacks these skills. Therefore, instruction in basic education skills may be necessary by the vocational educator. For information concerning basic or generalized skills instruction see Module 8.

Brown's 3-C Model

Brown's 3-C Model helps tie together many of the educational aspects discussed in this Overview. In general, Brown suggests that when delivering instruction to learners with special needs, the instructor can enhance the student's success rate and reduce feelings of frustration by considering the following 3-Cs of instruction: (a) correction, (b) compensation, and (c) circumvention (Brown & Dayser, 1982):

Correction. Providing feedback when the student's skills are being developed, thereby, correcting inappropriate behaviors immediately after they appear. Employing remedial reading and math services to enhance the student's ability to function within the program.

Compensation. Helping the student realize that each task represents only one of many activities contained in the course and that weaknesses in one area can often be offset by strengths in other areas. It should be communicated to the student that some tasks are inherently difficult and that he/she should not expect to achieve success immediately. Further efforts to compensate for the student would be to modify or adjust the delivery of instruction to extend over segments of several class periods. In addition, reinforcement during the early stages of instruction should be amply provided.

Note: Basically, "compensation" involves the instructor's modifications to the curriculum, learning environment, and instruction which has been discussed in this Overview.

Circumvention. If the vocational program is way out of reach for a student, for example, due to a course requirement of a relatively high level of reading skill, it may become necessary for the student to "circumvent" this difficulty by discussing alternate training programs with a vocational counselor.

Summary

Modification of curriculum, learning environment, and instruction can be an important key to successful employment training for special needs students. It requires that the instructor know his/her content completely, but the benefits to all students will likely be extraordinary.

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APPENDIX F

2 + 2 + 2 ARTICULATION PROJECT

1987 - 1988

DALLAS COUNTY COMMUNITY COLLEGE DISTRICT

2 + 2 + 2 ARTICULATION

As a result of the changes in office information systems technology, the electronic office requires a work force with many diverse skills and attributes. The traditional job categories and job titles of office workers have been replaced with an encyclopedia of positions supporting office information systems functions and activities.

To train the office personnel required to support these positions, the two-year secondary office education training program or the two-year community college office careers degree program may not provide the extensive training that business and industry requires. Most office information systems management positions require four-year college degrees.

In the past, office education programs offered through the high schools and the community colleges have presented duplicated training plans. Students who chose to enroll in community college office careers programs after high school often had to repeat many of the same competencies that they mastered in their high school vocational programs. If the students transferred to a four-year university program, many of the courses would not transfer. In most instances, the university program was a duplication of the high school and the community college training programs.

In order to prepare the office information systems workforce of the future, high schools, community colleges, and universities must develop coordinated training programs that help students in making a smooth transition from one educational level to another without experiencing delays, duplication of effort, or loss of credit.

A 2 + 2 + 2 articulation program in the area of office information systems will be developed in this six-year project. The program will provide a complete six-year training program that begins in grade eleven and joins the two-year Dallas County Community College degree program with the junior and senior years of the four-year University of North Texas Office Technology program. Several other junior and senior colleges and universities in Texas have shown interest in participating in this articulation project. The 2 + 2 + 2 articulation program will be developed according to the following process:

- Phase 1: The project administrator and the curriculum development specialist will establish a steering committee to develop a plan of action for project implementation. The steering committee will be divided into subcommittees to provide input into the development of the surveys, competency chart, secondary curriculum guides, competency profile, and the evaluation, tracking, and follow-up system.
- Phase 2: Businesses and industries in the Dallas-Fort Worth area and in three additional metropolitan areas will be surveyed by the project administrator and the curriculum development specialist to determine employment needs and to define the occupational career path for office information systems from entry level to management. Surveys will be completed and tabulated by November 15, 1987.
- Phase 3: DACUM analyses will be conducted of each major occupational category in the career path. The project administrator and the curriculum development specialist will serve as DACUM coordinators and two trained DACUM consultants will be hired to facilitate the DACUM's. The first DACUM will be completed and validated by February 1, 1987. It is anticipated that the remaining DACUM'S will be completed and validated by March 1, 1988. A competency continuum chart will then be developed by occupational category (entry level to advanced).

- Phase 4: The project administrator and the curriculum development specialist will work with representatives from the Occupational Curriculum Laboratory, East Texas State University, Dallas County secondary and DCCCD office education (information systems) faculty, and representatives from business and industry to develop the curriculum guides (including course outlines and instructional materials) and competency profiles using the results of validated DACUM analyses. Curriculum guides will meet the approved TEA guidelines for the State Office Education occupational cluster curriculum. Curriculum guides and profiles will be completed by May 15, 1988.
- Phase 5: The project administrator and the curriculum development specialist will work with a subcommittee of Dallas County secondary and DCCCD office education (information systems) faculty to develop a process to evaluate and upgrade course content and curriculum materials. Evaluation system will be completed and tested by May 15, 1988.
- Phase 6: The project administrator and the curriculum development specialist will conduct a curriculum workshop for secondary office education (information systems) faculty in Dallas County to review the curriculum guides including instructional materials and competency profiles. The workshop will be scheduled prior to June 15, 1988.
- Phase 7: The project administrator and the curriculum development specialist will work with a subcommittee of Dallas County secondary and DCCCD office education (information systems) faculty, occupational administrators, and placement personnel to develop a system to track students from grade eleven through the two-year community college and university programs. The Follow-up System will be compatible with the new DCCCD Career Planning and Placement System. The Follow-up System will be reviewed by the steering committee prior to June 15, 1988.
- Phase 8: The project administrator will work with vocational administrators from the Dallas Independent School Districts to revise existing articulation agreements. Agreements will be revised prior to June 30, 1988.

APPENDIX G

BLOOM'S TAXONOMY OF THINKING PROCESSES

DOMAINS	LEARNER OUTCOMES	VERBS
EVALUATION: (judging)	The learner forms a judgment based on facts, examples, and specific criteria.	appraises, compares, concludes, contrasts, criticizes, describes, discriminates, explains, justifies, interprets, relates, summarizes, supports, judges, evaluates, critiques
SYNTHESIS: (creating new)	The learner takes knowledge which is new to him/her and creates a whole from the bits and pieces.	categorizes, combines, complies, composes, creates, devises, designs, explains, generates, modified, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises
ANALYSIS: (taking apart)	The learner either breaks down an idea into its principal parts OR shows similarities/differences between things.	breaks down, diagrams, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, points out, relates, selects, separates, subdivides, analyzes, dissects, examines
APPLICATION: (using)	The learner does something with what they have learned. (using the information)	changes, computes, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses, applies, practices, employs, uses
COMPREHENSION: (understanding)	The learner changes the form of previously learned information either by translation, interpretation, or extrapolation. (understanding the information)	defends, distinguishes, estimates, explains, extends, generalizes, gives examples, infers, paraphrases, predicts, rewrites, summarizes, transforms, changes, restates
KNOWLEDGE:	The learner recalls or recognizes information previously presented to him/her	defines, describes, identifies, labels, lists, matches, names, outlines, reproduces, selects, states, tells, recalls, remembers, repeats, recognizes

APPENDIX H

HANDOUT 1

PC COMPARISON CHART

	PC XT	PC AT	386
Uses	Personal/Business	Personal/Business	Personal/Business Graphics/CAD/ Network
Microprocessor	Intel 8088	Intel 80286	Intel 80386
Dataword	8 bits	16 bits	32 bits
SPEED	4 - 8 mhz	6-12 mhz	12-20 mhz
OPERATING SYSTEM	MS-DOS	MS-DOS-OS/2	MS-DOS-OS/2
ADDRESSABLE MEMORY	640 K	16Mb	4Gb
DISK STORAGE			
5.25 floppy	360K DS/DD	1.2M DS/QD	1.2M DS/QD
3.5 stiffer	720K DS/DD	1.44M DS/QD	1.44M DS/QD
COST	\$400-\$2000	\$800-\$2000	\$1700-\$8000
STANDARD	1983-1986	1986-1987	1988-
USERS/ PROGRAMS	1/1	1/MANY	MANY/MANY

HANDOUT 2

DEVELOPMENT OF THE IBM PERSONAL COMPUTER

Company strategists never expected the PC to end up on corporate desktops. They set up a maverick outfit, the Entry Systems Division, and permitted its staff to break all unwritten corporate rules. They built the PC with off-the-shelf components from other companies. IBM then sold the PC in computer stores and did not try to make it compatible with everything else on the market! Critics argued that it was no big deal. All it could do was run CP/M programs that had been ported over from 8-bit machines. In fact, that was true. There was no software for the new machine. Some of the PC's early programs included WordStar, dBASE, and SuperCalc, all of which had migrated from the CP/M world. IBM saw the machine appealing to the same crowd buying the Apple II. IBM expected sales to top out at 250,000 units, a figure so meager that some of IBM's marketers refused to handle such a puny account! IBM eventually sold over 3 million units.

- Announced 8/12/81
- 16K or 64K, expandable to 544K
- Two 160K disk drives
- 8088 microprocessor, 16-bit, but with 8-bit bus to be compatible with current I/O devices
- PC-DOS 1.0
- PC-DOS 1.1 for 320K drives
- PC-DOS 2.0 for 360K drives

IBM's impact on personal computing has been very positive. It raised the stakes of the personal computer business substantially when it introduced the IBM PC. The IBM PC used a 16-bit processor when every other microcomputer had an 8-bit processor. The IBM PC offered more memory, making sophisticated business software possible. This in turn provided a platform for programs that revolutionized the personal computer industry and made it grow rapidly.

IBM PC XT

- Announced 8/8/83
- 256K on motherboard
- 10MB hard disk
- PC-DOS 2.0 for hard disk
- \$4995
- Sold over 2 million units

IBM PCjr

- Announced 11/1/83
- 64K
- Color monitor
- Optional 360K disk drive
- PC-DOS 2.1 for 1/2 height disk drive
- Keyboard that interfaced with the system unit via an infrared beam. To ensure that the PCjr did not encroach on its big brother's sales, IBM purposely gave the machine only an approximation

of PC compatibility. Home users were put off by the \$699 price tag. IBM came to the rescue with a multimillion dollar add campaign, 128K, a second disk drive and a redesigned keyboard. Sold an estimated 530,000 units April 1985, production stopped.

IBM Portable PC

Announced 2/16/84
256K

Did not support hard disks, lacked a parallel port, IBM's tardy and half-hearted response to the Compaq portable. IBM made the mistake of assuming that the Compaq was successful merely because it was portable, not because IBM did not have enough PC's to meet user demand. They crippled the Portable intentionally so it would not impact PC sales. The machine limped along for 16 months before IBM put it out of its misery.

IBM PC AT "Advanced Technology"

Announced 8/14/84
80286 16-bit microprocessor
6 MHz
20MB hard disk
1.4MB floppy disk

Problems with the hard disk disillusioned many users. Clone makers brought out bigger, swifter and cheaper 80286 machines. Estimated 650,000 units sold.

IBM PC II

Scaled down AT with an 80186 microprocessor
July, 1985, project cancelled
(Tandy 2000 used the 80186, and was likewise scrapped after a limited production cycle.)

IBM PC AT Enhanced

8 MHz
New style keyboard
Pulled into market well behind faster peers

IBM PC Convertible

Announced 4/2/86
IBM's tardy entry into the laptop wars, is a solid, reasonably priced machine that has failed to inspire the masses.

IBM PC XT/286

Announced 9/2/86
Expensive, incongruous hybrid that mated the AT's motherboard with the XT's chassis, and which is too small to hold AT boards. (Tandy 1000TX is an XT compatible using the 80286 microprocessor, but without the capabilities of the AT.)

HANDOUT 2/Development of the IBM Personal Computer

IBM PS/2 family

Announced 4/2/87

Model 25

Announced 8/1/87

8086 microprocessor

8 MHz

720K 3.5 inch disk

PC-DOS 3.3 for 3.5 inch drives

Combined system unit, disk drives and monitor, cannot run the new OS/2 operating system

Vector Graphics Array monitor

Model 30

8086 microprocessor

8 MHz

720K disk drive, 20MB hard drive

640K

PC-DOS 3.3, cannot run the new OS/2 operating system. Vector Graphics Array monitor

Model 50

80286 microprocessor

10 MHz

1.44MB 3.5 inch disk, 20MB hard disk

PC-DOS 3.3 and OS/2 for multitasking

1MB on motherboard

3 expansion slots

Model 60

80286 microprocessor

10 MHz

1.44MB 3.5 inch disk, 44 or 70 MB hard disk

PC-DOS 3.3 and OS/2 for multitasking

1MB expandable to 15MB

7 expansion slots

Model 80

80386 microprocessor

16 MHz

1.44MB 3.5 inch disk, 44, 70, 115MB hard disk

PC-DOS 3.3 and OS/2 for multitasking

2MB expandable to 16MB

7 expansion slots

SUPPLEMENTARY ACTIVITY

WHO HAS GAME

NOTE: This game may be used with any unit.

Materials needed: 30 index cards
black pen
word list

INSTRUCTIONS:

1. On one side of the index cards draw a line that splits the cards in half. On one end write "I HAVE" and on the other end write "WHO HAS."
2. Take the word list and write "I HAVE" terms on the "I HAVE" end of the index card and write the "WHO HAS" terms on the other end of the index card.
3. Shuffle all I HAVE/WHO HAS cards.
4. Deal out one card per student until the deck is exhausted.
5. Choose a student to begin the activity by reading the bottom portion of the "WHO HAS" (question).
6. The student in the class having the answer to the "WHO HAS" question at the top of his card responds by reading his card, "I HAVE" (statement). He then reads the bottom portion of the card "WHO HAS" (question).
7. Play continues in this same manner until all terms and definitions have been used. The game ends by returning to the student who began the game.

"I HAVE" categories

1. ASCII
2. EBCDIC
3. hardware
4. peripheral
5. software
6. program
7. programmer
8. user
9. batch
10. transaction
11. auxiliary
12. direct access
13. sequential access
14. compiler
15. field
16. record
17. file
18. master file
19. detail file
20. back up copies
21. assembly language
22. BASIC
23. FORTRAN
24. COBOL
25. PASCAL
26. RPG
27. PL/I
28. ADA
29. C
30. machine language

"WHO HAS" categories

1. coding scheme used on mainframes
2. physical parts of a computer system
3. input and output devices
4. computer programs
5. series of instructions which direct the computer
6. person who writes programs
7. person using the computer
8. processing data as a group
9. processing data individually
10. secondary storage
11. access of data in any order
12. access of data one record after the other
13. converts computer programs to machine language
14. one piece of information such as a date or name
15. a group of fields
16. group of related records
17. file which contains relatively permanent records
18. file which contain day-to-day transactions
19. copies made in case the original is damaged
20. language developed to make machine language easier
21. primary language for micros
22. oldest high-level language; used by scientists and mathematicians
23. language used for business applications developed by the help of Dr. Grace Hopper
24. used to teach beginners and named after a French inventor
25. used to write reports
26. developed by IBM; can be used in science and business applications
27. used by the U.S. Department of Defense
28. developed by AT&T; used with special effects in films
29. difficult language to learn
30. coding scheme used on microcomputers

SUPPLEMENTARY ACTIVITY

COMPUTER BINGO

NOTE: This game can be used with any section or combination of sections in this unit to aid in teaching and reviewing new material.

Materials needed: 1 sheet of typing paper per student
pencils
computer terms

INSTRUCTIONS:

1. Give each student one sheet of paper.
2. Have students draw five vertical lines down the 11" side of the paper.
3. Have students draw four vertical lines down the 8 1/2" side of the paper. Twenty (20) squares should result.
4. Designate the second square on the third row as a free space.
5. Write a list of terms on the board. Have students select terms at random and place one term in each square on their paper.

HOW TO PLAY

1. The teacher reads definition for one of the terms.
2. The students who have the term being defined on their card marks an X on that space on their card.
3. The student who finds all terms on his/her card first, wins.

SUPPLEMENTARY TESTS

MS DOS COMMANDS TEST

INSTRUCTIONS: Give the appropriate MS-DOS command to accomplish the following requests.

(Note: Assume the current drive is A, unless the problem specifies differently.)

1. Information about the files on the disk in drive A.
2. Information about the files, that will give one screenful at a time, on the disk in drive B.
3. A list of the file names only on the disk in drive B.
4. Information about all BAS files on the disk in drive B, if drive B is the current drive.
5. Copy the file named HOOP.BAS which is on a disk in drive A to a disk in drive B.
6. Copy the file names PROG1.CBL which is on a disk in drive A to a disk in drive B, giving the new file the name of PROGRAM1.CBL.
7. Copy everything in the current directory on drive A to drive B.
8. Delete everything in the current directory on drive A with the extension of BAK.
9. Delete the file CHAPT5.BAS which is on the disk in drive B.

MS DOS COMMANDS TEST/Continued

10. Rename the file _____ to _____
the file is on the disk in drive B, the current drive.
11. Display the content of AUTOEXEC.BAT which is on the disk in drive A.
12. Format and put the system files on the disk in drive B.
13. Format the disk in drive B.
14. Format and put a volume label on the disk in drive A.
15. Check the disk in Drive B for errors.
16. Make a subdirectory called WORD on the disk in drive A.
17. Change back to the root directory on the current drive.
18. Remove the empty subdirectory called WORK from the current drive.
19. Set the path to search drive A if drive B is the current drive.

MS DOS COMMANDS TEST

ANSWERS

1. A> DIR
2. A> DIR B: /P
3. A> DIR B: /W
4. B> DIR *.BAS
5. A> COPY HOOP.BAS B:
6. A> COPY PROG1.CBL B:PROGRAM1.CBL
7. A> COPY *.* b:
8. A> DEL *.BAK
9. A> DEL B:CHAPT5.BAK
10. B> RENAME BUDGET01.WKS BUDGET10.WKS
11. A> TYPE AUTOEXEC.BAT
12. A> FORMAT /V
13. A> FORMAT B: /S
14. A> FORMAT B:
15. A> CHKDSK B:
16. A> MKDIR WORD A> MD WORD
17. >CD\
18. >RMDIR WORK >RD WORK
19. B> PATH A:\

MS DOS TEST

Project 1

INSTRUCTIONS: Select the correct command for each description.

A.	A:	J.	DISKCOPY	S.	PROMPT
B.	BACKUP	K.	KEYBFR	T.	REN
C.	CD	L.	RD	U.	RESTORE
D.	CHKDSK	M.	EDLIN	V.	SORT
E.	CLS	N.	FDISK	W.	SYS
F.	COPY	O.	FIND	X.	TREE
G.	DATE	P.	FORMAT	Y.	TYPE
H.	DEL	Q.	MD	Z.	MORE
I.	DIR	R.	PRINT		

- _____ 1. Used to create a subdirectory on the disk
- _____ 2. Gives the number of files and bytes free on a disk
- _____ 3. Erases a file from a disk
- _____ 4. Displays the contents of a file on the screen
- _____ 5. Displays the contents of a file on the printer
- _____ 6. Allows the user to change the name of a file on disk
- _____ 7. Displays the names of the files stored on a disk
- _____ 8. Erases the screen
- _____ 9. Used to enter the correct data into the computer
- _____ 10. Allows the user to customize a DOS prompt
- _____ 11. Changes from one subdirectory to another
- _____ 12. Removes a subdirectory from the disk
- _____ 13. Makes an exact copy of a file onto another disk
- _____ 14. Makes an exact copy of one disk onto another disk
- _____ 15. Initializes a disk for use
- _____ 16. A filter that allows you to order information
- _____ 17. A filter used to display one screen at a time

MS DOS TEST/Continued

- _____ 18. A simple line editor word processor
- _____ 19. Displays all directories and subdirectories

Project 2

INSTRUCTIONS: Write out brief answers to the following questions.

1. Describe two reasons for the use of extension names.
 - a.
 - b.
2. What is meant by an internal command?
3. What is meant by an external command?
4. Why is there a distinction between internal and external commands?
5. What is the purpose of the AUTOEXEC.BAT file?
6. What is the purpose of a BATCH file?

MS DOS TEST/Continued

7. What are four characteristics of an operating system?
 - a.
 - b.
 - c.
 - d.
8. What are four categories of an system software?
 - a.
 - b.
 - c.
 - d.
9. What happens when you format a disk?
10. List two good reasons for using subdirectories:
 - a.
 - b.
11. What are the two wild card symbols and their functions?
 - a.
 - b.

Project 3

INSTRUCTIONS: Assume that MS-DOS is in drive A: and that the data disk is in drive B:.
What are the commands to accomplish the following?

1. Assume you are in drive B:. What sequence of commands must you type to see a directory of drive A: on a clear screen?
2. Assume you are in the ROOT directory on drive A:. What sequence of commands must you enter to copy a file named FRIEND.DAT from this directory to the subdirectory WORDS on drive B?
3. What keys must you press to do a soft reboot of the system?
4. Make a duplicate MS-DOS disk.
5. Add all files from drive A to B.
6. Get rid of all files that begin with a W.
7. Change the extension name of all files with the extension DOC to TXT.
8. Create a bootable disk.
9. Redirect the DIRectory output to the printer.
10. Display the contents of _____ document to the screen.
11. Display the contents of _____ document to the printer.

MS-DOS TEST

ANSWERS

Project 1

1. Q
2. D
3. H
4. Y
5. R
6. T
7. I
8. E
9. G
10. S
11. C
12. L
13. F
14. J
15. P
16. V
17. Z
18. M
19. X

Project 2

1.
 - a. Computer-distinguish file types, to know if they are executable, commands, batch, or other.
 - b. Human-distinguish files by types and for organizing files.
2. A DOS command that is part of the operating system. It is loaded when you boot the computer.
3. A DOS command that remains on disk. It is loaded into memory only when it is needed, thus saving primary memory space.
4. When MS-DOS was first created, memory was prime real estate. All the operating system commands could not fit in primary memory. Therefore, the less used commands were left out of the operating system to conserve primary memory.
5. The AUTOEXEC.BAT file is a batch file that will automatically execute when the computer is first booted.
6. A batch file is a list of DOS and special commands, stored in a file, and are executed, as if they were typed in from the keyboard.
7.
 - a. Communication between primary memory and peripheral devices
 - b. Method of transferring data from RAM to disk and from disk to RAM
 - c. Data management
 - d. Commands that allow you to manipulate the computer

MS-DOS TEST/ANSWERS/Continued

8.
 - a. Operating System
 - b. Utilities
 - c. Language Processors
 - d. User Interface Shell
9.
 - a. Erases anything that was on the disk
 - b. Sets up tracks and sectors
 - c. Creates the BOOT area
 - d. Creates the FAT area
 - e. Creates the ROOT DIRECTORY area
 - f. Blocks out any bad sectors
10.
 - a. To organize files into different directories, keep all similar files in individual directories
 - b. Limitation of the ROOT directory necessitates the use of subdirectories
11.
 - a. ?--replaces single character
 - b. *--replaces 1 to 8 characters

Project 3

1. B>A:
A>CLS
A>DIR /W
2. A>COPY FRIEND.DAT B:\WORDS\
3. CTRL-ALT-DELETE
4. A>DISKCOPY A: B:
5. A>COPY *.* B:
6. A>DEL W*.*
7. REN *.DOC *.TXT
8. A>FORMAT B:/S
9. A>DIR > PRN
10. A> _____ .DOC
11. A>PRINT _____ .DOC or A>TYPE _____ .6DOC > PRN

OPERATING SYSTEMS SKILLS TEST

INSTRUCTIONS: Assume MS-DOS is in drive A: and your data disk is in drive B: for all applicable questions. List the commands to accomplish the following:

1. Create a bootable data disk.
2. Put a volume label on a disk that has been formatted.
3. Put the system on a formatted disk.
4. Create a subdirectory for word processing and within that subdirectory create a subdirectory for storing documents.
5. From the ROOT directory, change to the DOC subdirectory.
6. Copy a file from drive A: to the DOC subdirectory.
7. Make a duplicate copy of a disk.
8. Copy all files from drive A: to drive B:.
9. Delete all files that start with F.
10. List all BASIC programs.
11. Echo the last DOS command.

OPERATING SYSTEMS SKILLS TEST/Continued

12. Echo the last DOS command one character at a time.
13. Echo the last DOS command up to a specific letter.
14. Echo the last DOS command from a specific letter on.
15. Print the screen.
16. Rename a file DEMO.TXT.
17. Delete all files with the extension .SYS.
18. Clear the screen.
19. Remove the subdirectory DOC.
20. Copy a file from drive A: to B: and give it a new name.
21. Copy a file to the same disk with a new name.
22. Return to the ROOT directory from a subdirectory.
23. Return to the next upper level subdirectory, and you do not know the name of that subdirectory.

OPERATING SYSTEMS SKILLS TEST/Continued

24. Display the current VOLUME label.
25. Display all directories and subdirectories.
26. Display the current version of DOS.
27. Change the current date.
28. Reboot the computer.
29. Display the contents of a text file on the screen.
30. Display the contents of a text file on the printer.
31. Copy a listing of the directory to disk.
32. Copy a listing of the directory to the printer.
33. Sort all files on disk by file name.
34. Sort all files on disk by extension name.
35. Create a batch file from the console.
36. Display the amount of free space on drive B.

OPERATING SYSTEMS SKILLS TEST/Continued

- 37. Change the prompt to display the current directory.
- 38. All files on your data disk have your initials for an extension name. You recently changed your last name and now you must change your initials on all the files.
- 39. Create a batch file that will be executed automatically when you boot the computer.
- 40. Create a batch file that will automatically start a program called WRITE, in the subdirectory WORD, when you type in the command TYPE.
- 41. Set up your data disk so that when you boot the computer it will clear the screen and display a custom prompt showing the time and date on one line, the current directory on the next line, and followed by the > sign.
- 42. Search a disk for the file named _____
- 43. Create a virtual (RAM) disk drive C: with 100K of memory.

OPERATING SYSTEMS SKILLS TEST

ANSWERS

1. A>FORMAT B:/S
2. A>LABEL B:
3. A>SYS B:
4. A>MD WORD
A>CD WORD
A>MD DOC
5. A>CD \WORD\DOC
6. A>COPY filename \WORD\DOC
7. A>DISKCOPY A: B:
8. A>COPY *.* B:
9. A>DEL F*.*
10. A>DIR *.BAS
11. F3
12. F1 or right arrow key
13. F2 then specified character
14. F4 then beginning character
15. Shift-PRTSCN
16. A>REN DEMO.TXT DEMO1.TXT
17. DEL *.SYS
18. CLS
19. A>CD \WORD\DOC change to DOC subdirectory
A>DEL *.* delete all files in DOC directory
A>CD \WORD change to WORD directory
A>RD DOC remove DOC directory
20. A>COPY filename.ext B:newname.ext
21. A>COPY filename.ext B:newname.ext

OPERATING SYSTEMS SKILLS TEST/ANSWERS/Continued

- 22. A>CD\
- 23. A>CD..
- 24. A>TREE
- 25. A>VOL
- 26. A>VER
- 27. A>DATE
- 28. CTRL-ALT-DELETE
- 29. A>TYPE filename.ext
- 30. A>PRINT filename.ext
or A>TYPE filename.ext > PRN
- 31. A>DIR > filename.ext
- 32. A>DIR > PRN
- 33. A>SORT | DIR
- 34. A>SORT | DIR /+8
- 35. A>COPY CON filename.BAT
- 36. A>CHKDSK
- 37. A>PROMPT \$PSG
- 38. A>REN *.INT *.INS
- 39. A>COPY CON AUTOEXEC.BAT
- 40. A>COPY CON TYPE.BAT
ECHO OFF
CD \WORD
WRITE
^Z
- 41. A>COPY CON AUTOEXEC.BAT
ECHO OFF
CLS
PROMPT \$T \$D\$ _\$PSG
- 42. A>DIR MORE.COM
- 43. A>COPY CON CONFIG.SYS
DEVICE=VDISK.SYS,100

HISTORY OF THE MICROCOMPUTER AND THE SPREADSHEET

During World War II, computers were developed for use in the military. They were used for decoding messages and for projecting shell trajectories.

By the early 1950s, large computers were introduced to very large businesses. By 1970, however, almost all large corporations had at least one large computer, and the small and medium sized firms had smaller computers. At this time, the main use for computers was in the financial management of the company. These operations were in accounting and payroll applications. Computers were also used for tasks that required rapid processing of large volumes of information.

The early computers needed special care. They had to be in special computer rooms in a very carefully controlled, secure environment. They operated 24 hours a day so that companies would be able to recover their costs. There were no thoughts of the user having any needs except making sure that the computer was working all the time to get the most for the money. The average manager did not have access to these machines.

Intel Corporation made the first microchip in 1974. They had developed the first microprocessor and the 8008 chip. This invention was the first step in the formation of microcomputers. It condensed thousands of electronic circuits on one tiny silicon chip. Later, Intel developed another chip they used in the 8088 microprocessor. It was mainly used by computer hobbyists as the chip for microcomputer kits.

Soon a more advanced processor was developed and integrated with other components. These machines were sold as kits that were made into the first commercial microcomputers. However, they did not resemble the micros of today. Machine language was the only programming language that could be used. Computers were still impractical for the average person because they had no disk drives or printers. Therefore, computers were only used by the few who had advanced technical abilities.

The Apple I kit was introduced by Steve Wozniak and Steve Jobs in 1977. Although there were more than 500 kits sold, the Apple II, a preassembled computer with a disk drive and an operating system, soon was put on the market. The Tandy/Radio Shack corporation introduced the TRS-80 Model I at that time too.

These major developments finally allowed nontechnical users to utilize new computer technology. Users no longer had to assemble the machines and test them. Users could go to the local computer store and purchase a computer. These new computers were built for the public user. Printers, disk drives, and telephone modems were added equipment that could be purchased for use with the computer. The BASIC language evolved as the most practical language to write programs.

The only way to do anything with the computer at this time was to program it yourself. There were no commercial software programs available for use. This kept the computer industry from expanding because the average business person did not have time to write programs.

This problem was solved when VisiCalc, the first spreadsheet program, was introduced in 1978. The concept of keeping records had been a part of history for some time. Long ago, records were kept on tablets of stone or pieces of wood by marking on them to keep track of the goods traded. Business soon became very complex. Later, writing numbers on paper was used to keep track of transactions. The abacus and the slide rule were developed to ease the calculating burden. The adding machines that took their place were soon replaced by a more powerful tool, the calculator. Now, however, the computer is the main tool used to record and manipulate numbers more easily.

VisiCalc is credited with being the first and best-known spreadsheet for microcomputers. It was originally designed to work on the Apple II, but versions were also developed for the TRS-80, Commodore, and the Atari. VisiCalc was developed by a Harvard Business School student, Dan Bricklin, and Robert Frankston, a student at MIT. It was primarily designed to help Bricklin on his nightly homework, which was to solve three extensive financial business problems each night.

Neither Bricklin nor Frankston expected the impact that their program had on the entire computer industry. The VisiCalc program is credited with the success of the microcomputer industry. It is said that the history of the spreadsheet is the history of microcomputers.

The timing of the introduction of VisiCalc and the Apple brought them together. VisiCalc put the Apple on the map, and it stimulated the growth of business software projects for the future. VisiCalc gave credibility to microcomputers; they were now known as tools, not "high-tech toys." The machines and the programs were soon brought to the office. It did not take long before those who were utilizing computers at work out-produced their colleagues.

Other spreadsheet programs were introduced. SuperCalc, primarily used on CPM machines, was introduced shortly after the IBM PC was introduced in 1981. SuperCalc became the second most popular program, and it was available for several computers. While VisiCalc and SuperCalc were two of the most popular first generation spreadsheets, there were several others. These tools were a definite improvement over the more traditional tools of financial analysis: the worksheet, the pencil, and the calculator. VisiCalc's practicality and flexibility made it the most popular program in the history of microcomputing. Both VisiCalc and SuperCalc were dominant software programs. Despite the fall of VisiCalc, SuperCalc still continues to be a prominent package.

In 1983, several software packages emerged that are considered the second generation of spreadsheet programs. These programs were developed to correct the weaknesses in the first generation programs, and they also included additional features that former users "wished for," such as:

- * the ability to link individual spreadsheets into an integrated system of sheets
- * more powerful arithmetic and formatting functions
- * the ability to fully integrate graphics, database management, and word processing

Users also wanted to take advantage of the IBM personal computer's powerful features because the PC had become the industry standard. Most of these were new programs, and the most successful one was Lotus 1-2-3.

Lotus 1-2-3 was the first spreadsheet to run on the PC. Soon after its introduction, several other programs were made available. SuperCalc2 had several new enhancements, including date arithmetic, the ability to manipulate text entries, and a command that allowed consolidation of different sheets into a summary sheet. Multiplan introduced the capability of linking several different worksheets (like pages in a book) into one large model. Context MBA and Lotus 1-2-3 also had the capability of integrating graphics and data management with advanced spreadsheets. Although Context MBA was the first program to integrate five applications (word processing, spreadsheet, database, graphics, and communications) into one program, it had several major flaws that made it unpopular.

Mitch Kapor, president of Lotus Development Corporation, and Jonathan Sach, then vice-president of Research and Development at Lotus, created Lotus 1-2-3. Kapor wrote the graphics portion of the VisiCalc program, and developed the 1-2-3 program with the purpose of beating out VisiCalc. The 1-2-3 program capitalized on the same conventions used by VisiCalc. A lot of money was spent giving 1-2-3 a lot of pre-market hype. This tactic worked because, within a year, 1-2-3 surpassed VisiCalc, and continued its dominance by becoming the software industry's standard.

By the middle of 1984, Lotus introduced Symphony, which integrated all five applications: spreadsheet, database management, graphics, word processor, and communication functions. All of these applications were based on the spreadsheet.

About this same time, dBase and Framework introduced programs that contained these same functions. The buying public, however, decided that they liked to have these functions in separate packages. Thus, Lotus 1-2-3 has been upgraded several times to make it more attractive to the user.

Lotus 1-2-3 was a very serious, self-designed, business software program. It brought the IBM PC into the business office. Apple no longer met the business professional's needs. It did not have the same qualities that the PC had: crisp, monochrome resolution, a high-quality keyboard, and 1-2-3.

Ed Belou, vice president of Research and Development at Lotus, feels that the only creative innovation of PC software has been the spreadsheet. Everything else is an adaptation. The databases were adapted from the mainframe and minicomputer databases. Word processing programs were adapted from the dedicated word processing programs. Although there were some financial analysis programs available (on time-sharing basis) on the mainframe, they were a different type of tool before VisiCalc. They did not have the grid that VisiCalc introduced. Nor were there cell formulas or any operations for recalculating. In a nonthreatening way, the spreadsheet allowed everyone to be a programmer. Lotus 1-2-3 allowed everyone to have computer power at their finger-tips so that more work could be accomplished than ever before.

One of the major features of the 1-2-3 program is the use of macros. Macros are simple programming language subroutines. Lotus expanded this feature in each of their releases since they found out how unique macros are. Macros originally were a bonus feature. The modern manager was able to use the spreadsheet because there were several design concepts that all spreadsheet programs share:

- * They have a common frame of reference.
- * They are easy to learn. They have a generic format so that once you have learned one, it is easy to learn another.
- * They are easy to use. There are only a few commands to learn, and most programs provide on-line help.
- * They provide instant feedback--changes are immediately reflected on the screen.

Meanwhile, VisiCalc people were having difficult times. While Lotus was basking in the glory of having the new premier product on the market, Software Arts, the company founded by Bricklin and Frankston, became involved in a lawsuit with their main distributor, VisiCorp. VisiCorp claimed that Software Arts had failed to upgrade the product to keep it up-to-date and competitive. Software Arts counter-claimed that VisiCorp failed to promote and produce the program adequately. While eventually the suit was settled out of court, a great deal of damage was done to both companies. On May 31, 1985, the last version of VisiCalc was shipped.

By 1985, Lotus 1-2-3 was four years old, and it needed to be upgraded. Other competitors had not been sitting around. They had utilized several aspects of the Lotus program and added new features of their own. Lotus was not going to be out-done; it introduced version 2.0 in 1985. This version was a no-nonsense approach: it was expanded to four times the workspace, it had a coprocessor, Electronic Mail System support, string functions, and 40 more macro commands. Shortly after this upgrade, version 2.1 came out, and it kept Lotus 1-2-3 on top until 1987, when Microsoft came out with Excell for the 286 and 386 machines. Again, Lotus 1-2-3 would not be out-done--it came out with version 3.0, which is both downward and upward compatible.

New spreadsheet programs are being introduced almost weekly. Each spreadsheet package varies in price as well as in features. Now there is one on the market to fit either an individual's or a business's needs. However, as soon as a spreadsheet is introduced and adopted by the public, a new and better program is available with more features than the one purchased and adopted.

HISTORY OF VISICALC

SPRING 1970	The Massachusetts Institute of Technology Lab for Computer Science students, Daniel Bricklin and Robert Frankston become good friends and discuss going into business together.
1973-1978	Frankston is a computer consultant, and Bricklin works for Digital Equipment Corporation (1973-76) and Fastax Corporation (1976-1977).
SPRING 1978	Bricklin is now a MBA student at Harvard Business School, and he envisions an electronic spreadsheet program that would eliminate the drudgery of the calculations for his business class homework.
FALL 1978	Bricklin takes a prototype to Frankston, who agrees to help develop a workable version of the program.
WINTER 1978	Fellow Harvard MBA student, Dan Fylstra agrees to market the new software for Bricklin and Frankston through his own young company--Personal Software.
JANUARY 1979	Software Arts is incorporated by Bricklin and Frankston. They work out of Frankston's attic in Arlington, Massachusetts.
SPRING 1979	The first electronic spreadsheet gets its name, VisiCalc, which stands for Visible Calculator.
MAY 1979	Personal Software moves from Massachusetts to California's Silicon Valley.
JUNE 4, 1979	VisiCalc is shown to the public at the National Computer Conference in New York.
OCTOBER 1979	VisiCalc for the Apple II is shipped to the public.
AUGUST - SEPT. 1980	VisiCalc becomes available for other major machines, including the Commodore Pet, Atari, Hewlett Packard, and TRS-80-Model I computers.
MAY 1981	VisiCalc sales exceed \$100,000, making it the best-selling computer program to date.
OCTOBER 1981	VisiCalc is the spreadsheet that is shown as the first product introduced with the IBM PC.
FEBRUARY 1982	Personal Software changes its name to VisiCorp.
OCTOBER 25, 1982	Lotus Development Corporation introduces 1-2-3, and by February 1983, VisiCalc sales exceeded \$500,000.
SEPTEMBER 1984	VisiCorp sues Software Arts for breach of contract, claiming Software Arts failed to upgrade the product to keep it competitive.
FEBRUARY 7, 1984	Software Arts files lawsuit, claiming VisiCorp failed to promote the product adequately.

- SEPTEMBER 17, 1984** Software Arts and VisiCorp settle the lawsuit out of court, but the legal battles have crippled both companies.
- NOVEMBER 1984** VisiCorp sold most of its remaining products to raise cash. Merges with, and then starts up Paladin.
- MAY 1985** The assets of Software Arts, including VisiCalc, are acquired by lots.
- MAY 31, 1985** The last version of VisiCalc is shipped.

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COMPLIANCE STATEMENT

TITLE VI, CIVIL RIGHTS ACT OF 1964; THE MODIFIED COURT ORDER, CIVIL ACTION 5281, FEDERAL DISTRICT COURT, EASTERN DISTRICT OF TEXAS, TYLER DIVISION

Reviews of local education agencies pertaining to compliance with Title VI Civil Rights Act of 1964 and with specific requirements of the Modified Court Order, Civil Action No. 5281, Federal District Court, Eastern District of Texas, Tyler Division are conducted periodically by staff representatives of the Texas Education Agency. These reviews cover at least the following policies and practices:

- (1) acceptance policies on student transfers from other school districts;
- (2) operation of school bus routes or runs on a non-segregated basis;
- (3) nondiscrimination in extracurricular activities and the use of school facilities;
- (4) nondiscriminatory practices in the hiring, assigning, promoting, paying, demoting, reassigning, or dismissing of faculty and staff members who work with children;
- (5) enrollment and assignment of students without discrimination on the basis of race, color, or national origin;
- (6) nondiscriminatory practices relating to the use of a student's first language; and
- (7) evidence of published procedures for hearing complaints and grievances.

In addition to conducting reviews, the Texas Education Agency staff representatives check complaints of discrimination made by a citizen or citizens residing in a school district where it is alleged discriminatory practices have occurred or are occurring.

Where a violation of Title VI of the Civil Rights Act is found, the findings are reported to the Office for Civil Rights, Department of Health, Education and Welfare.

If there is a direct violation of the Court Order in Civil Action No. 5281 that cannot be cleared through negotiation, the sanctions required by the Court Order are applied.

TITLE VII, CIVIL RIGHTS ACT OF 1964; EXECUTIVE ORDERS 11246 AND 11375; TITLE IX, 1973 EDUCATION AMENDMENTS; REHABILITATION ACT OF 1973 AS AMENDED; 1974 AMENDMENTS TO THE WAGE-HOUR LAW EXPANDING THE AGE DISCRIMINATION IN EMPLOYMENT ACT OF 1967; AND VIETNAM ERA VETERANS READJUSTMENT ASSISTANCE ACT OF 1972 AS AMENDED IN 1974.

It is the policy of the Texas Education Agency to comply fully with the nondiscrimination provisions of all federal and state laws and regulations by assuring that no person shall be excluded from consideration for recruitment, selection, appointment, training, promotion, retention, or any other personnel action, or be denied any benefits or participation in any programs or activities which it operates on the grounds of race, religion, color, national origin, sex, handicap, age, or veteran status (except where age, sex, or handicap constitute a bona fide occupational qualification necessary to proper and efficient administration). The Texas Education Agency makes positive efforts to employ and advance in employment all protected groups.